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THE
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Engineering
Finance Commerce

YALE UNIVERSITY

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SHANGHAI—MANILA

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One of the mud-walled cities which dot the country in North Shansi. The walled city is in the back-ground. The houses in the foreground are built of mud in a loess chasm

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THE FAR EASTERN REVIEW

COMMERCE :: ENGINEERING :: FINANCE

VOL. X.

SHANGHAI AND MANILA, AUGUST 1913

No. 3

PEKING-KALGAN-TATUNG-FU RAILWAY

WORK ON THE CHANGSUI EXTENSION

Construction work on the extension of the Kalgan line to Tatung-fu has progressed so well during recent months that the Engineer-in-chief, Mr. K. Y. Kwong, is hopeful of seeing railhead at the river opposite Tatung-fu, in north-eastern Shansi, by October of this year.

The financial difficulties confronting the Government will no doubt lead to an abandonment for some time of the original idea of pushing the line through to Suiyuan in the north-western corner of Shansi, close to the Mongolian frontier.

At present the extension is open to traffic as far as Yangkuohsien, some 80 miles from Kalgan. The total length of the line from Peking to Yangkuohsien is 204 miles. Tatung-fu is but 20 miles from Yangkuohsien, giving a total of some 224 miles. This is the longest stretch of railway in the country built solely by Chinese engineers with Chinese capital and operated by Chinese railway men.

It is an important route which opens up the vast cereal producing lands of the north of Chihli and Shansi provinces, and brings the products of the rich rolling downs of Inner Mongolia in touch with valuable markets. Already the line has had a marked effect upon the development of the country through which it passes, and was the means last year of taking about a million sterling into Shansi in return for products shipped to southern markets. Such a thing had never been dreamt of by the farmers, and they now look forward to greater returns as facilities are developed. In the March issue of the FAR EASTERN

REVIEW (pages 456-457) special mention was made of this encouraging effect of the construction of the line.

Recently a representative of this journal journeyed as far as Tatung-fu and found the construction work well in hand. The engineers were extremely keen, and had solved the various problems which confronted them in a highly creditable manner. There was no slum-

most minute investigation, and have allowed for most abnormal flood visitations. The levels, too, were adopted only after exhaustive surveys. Faced with heavy gradients and varying country—a rise almost the whole way from Kalgan—they were compelled to be cautious to adopt none but a route that would give not only a minimum in grade but also a minimum in cutting, and much time and

labor were spent in this connection. A maximum grade of one in one hundred and thirty was ultimately secured, with a minimum curve radius of 1,500 feet.

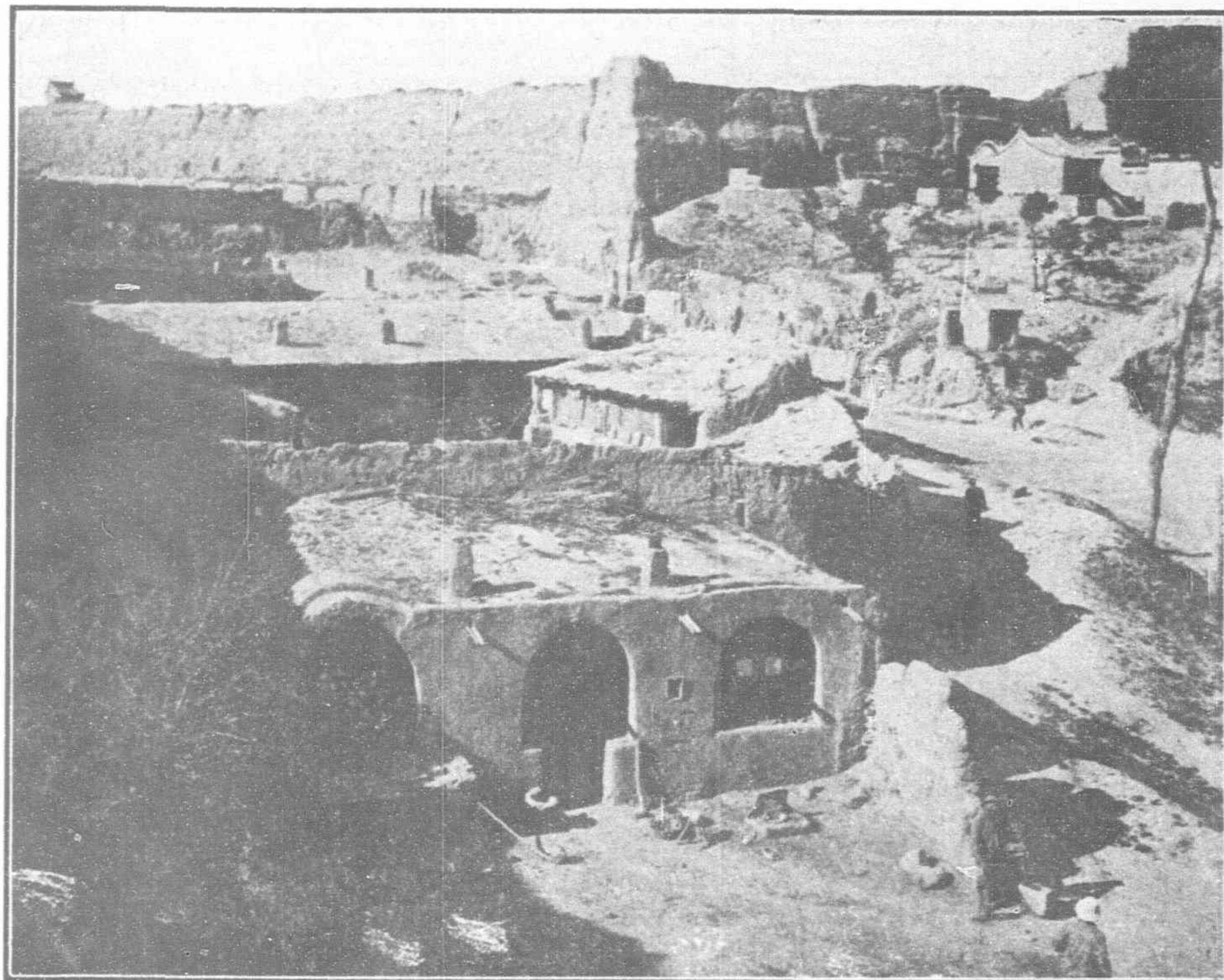
At a point near Tatung the line reaches a height of 4,000 feet above sea level, the up grade from Kalgan being continuous for 90 miles. Then there is a drop to Tatung-fu, which is 3,445 feet above the sea.

Altogether the waterway provided for on the extension totals on the first division 9,310 feet and on the second division some 5,695 feet.

The longest bridge is over the Yu river, seventeen spans of 100 feet each being required to cross to Tatung-fu. Across the Ta-yang river there is a bridge of 17 spans of 100 feet each; the river at Kalgan, is crossed by five 100 feet

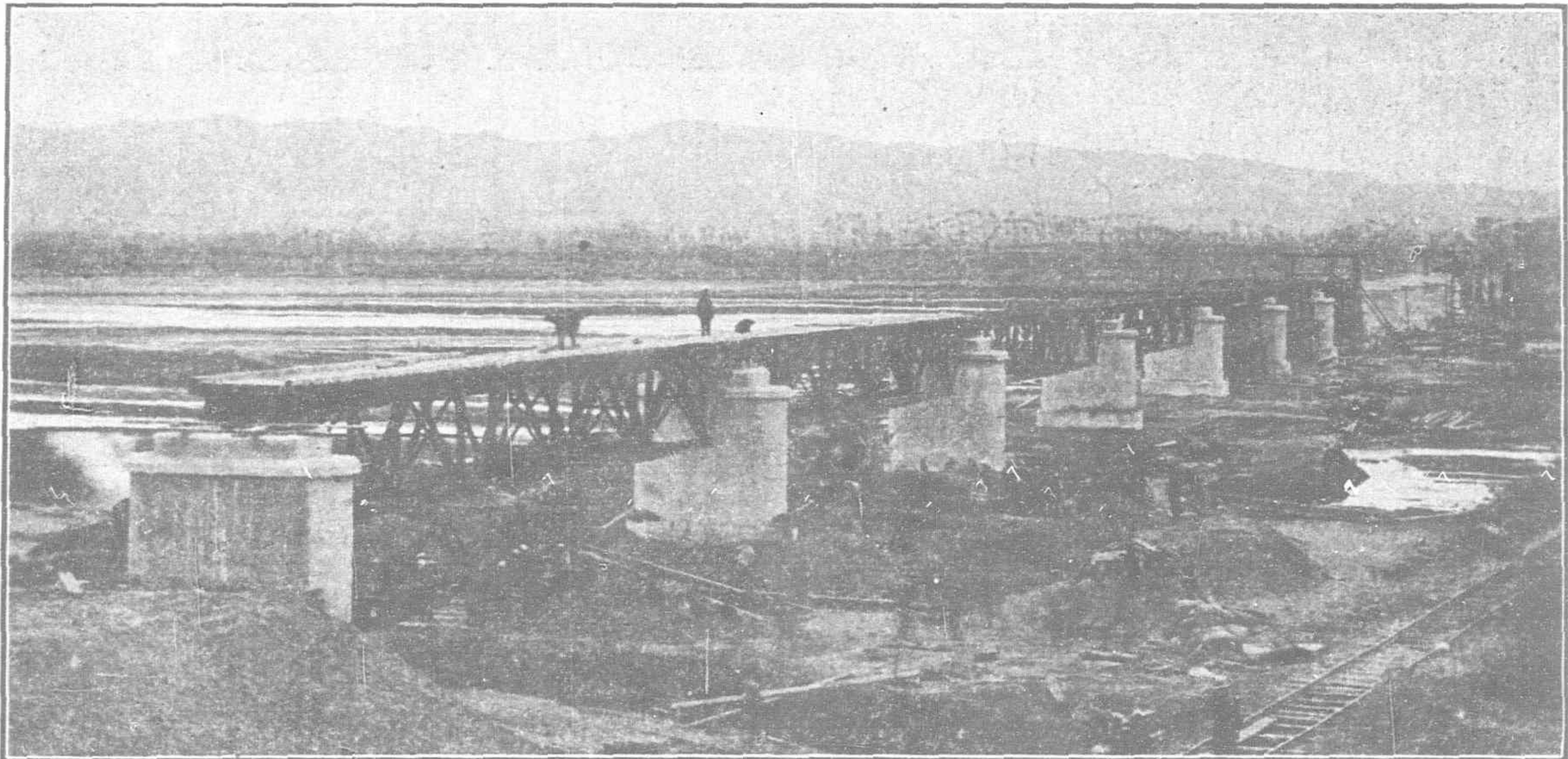
spans, while the Yangho is also crossed by a bridge of similar length. These are the most important bridges on the line, but in several places large concrete culverts have been built to carry embankments across the loess chasms.

Cuttings vary from 60 feet downwards. They are mostly on the first division of the line; while the second division is characterised by embank-



PEKING TATUNG-FU RAILWAY.—One of the mud-walled cities which dot the country in North Shansi. The walled city is in the back-ground. The houses in the foreground are built of mud in a loess chasm.

ming; no leaving of things to chance—and perhaps excessive care was exercised in those territories where heavy rainfalls are destructive, to preserve the line from the ravages of flood. Usually the Chinese are credited with erring on the wrong side in this respect, but not so Mr. Kwong and his associates. In their embankments, their bridges and waterways they have proceeded only after



Construction of the Ta Yang-ho Bridge

ments, the highest running to 60 feet. The most difficult of these have been necessitated by loess gulches with which the country is scored.

The track is of standard gauge with an 85 lb. rail, chiefly the product of the Hanyang ironworks at Hankow, on the Yangtze River.

The sleepers are Japanese hardwood.

Stations are about ten miles apart, and at every station water tanks have had to be provided in case of emergency owing to the scarcity of water. The station buildings have been built on the plans of those of the Kalgan line.

The Changsui Extension is a continua-

tion of the Peking-Kalgan line and derives its name from the first syllable of Changkiakow (the Chinese name of Kalgan) and the first syllable of Suiyuan, in north-western Shansi, the objective of the line.

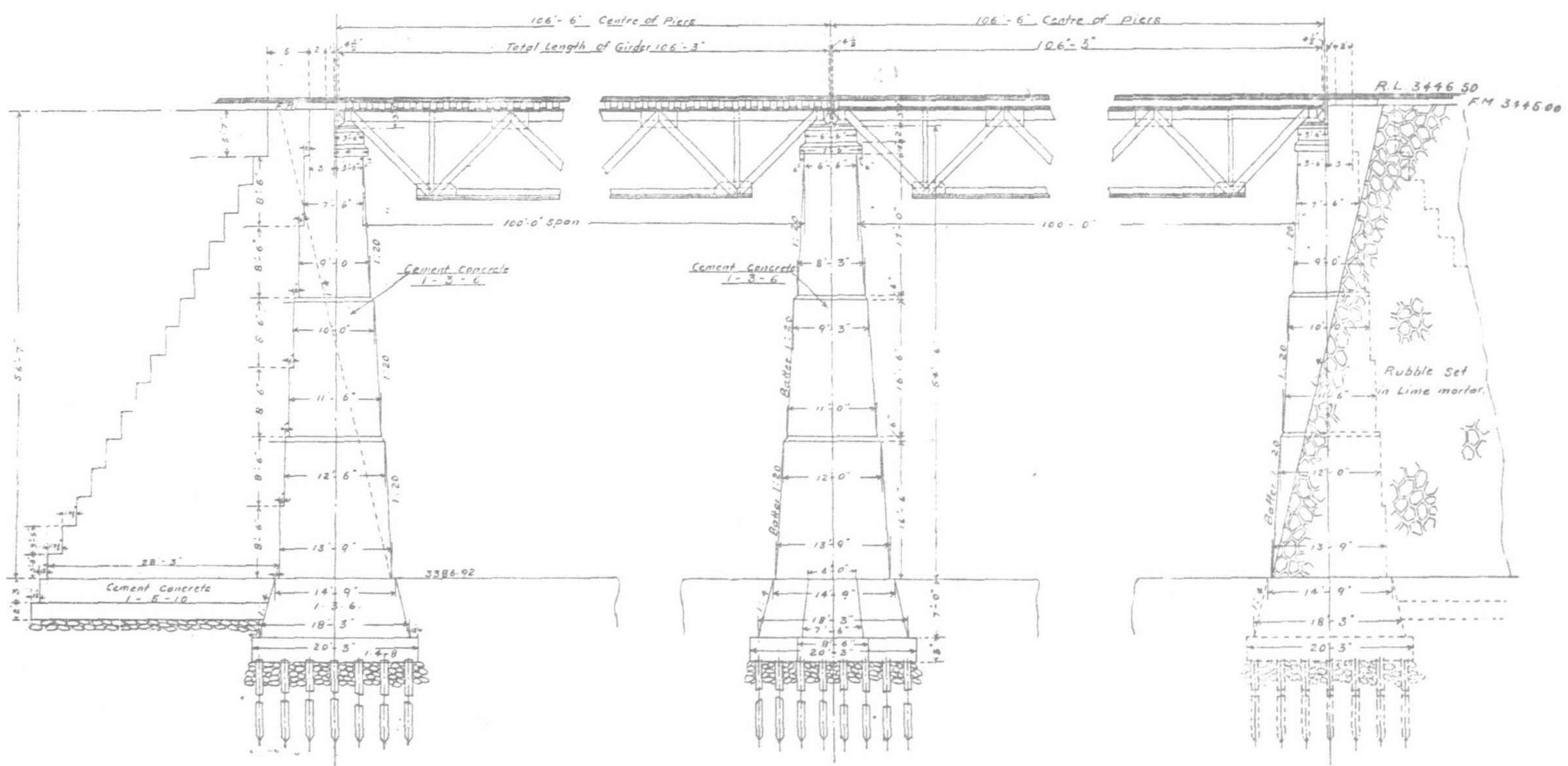
Survey work on the first portion of the route began in September, 1908, and by September, 1909, the line was located for a distance of fifty miles, as far as Tiencheng.

Construction work was commenced in April, 1910, and railhead reached Tiencheng in June of 1911.

Mr. Jeme Tien-yu, who was the chief engineer of the Kalgan line, was in

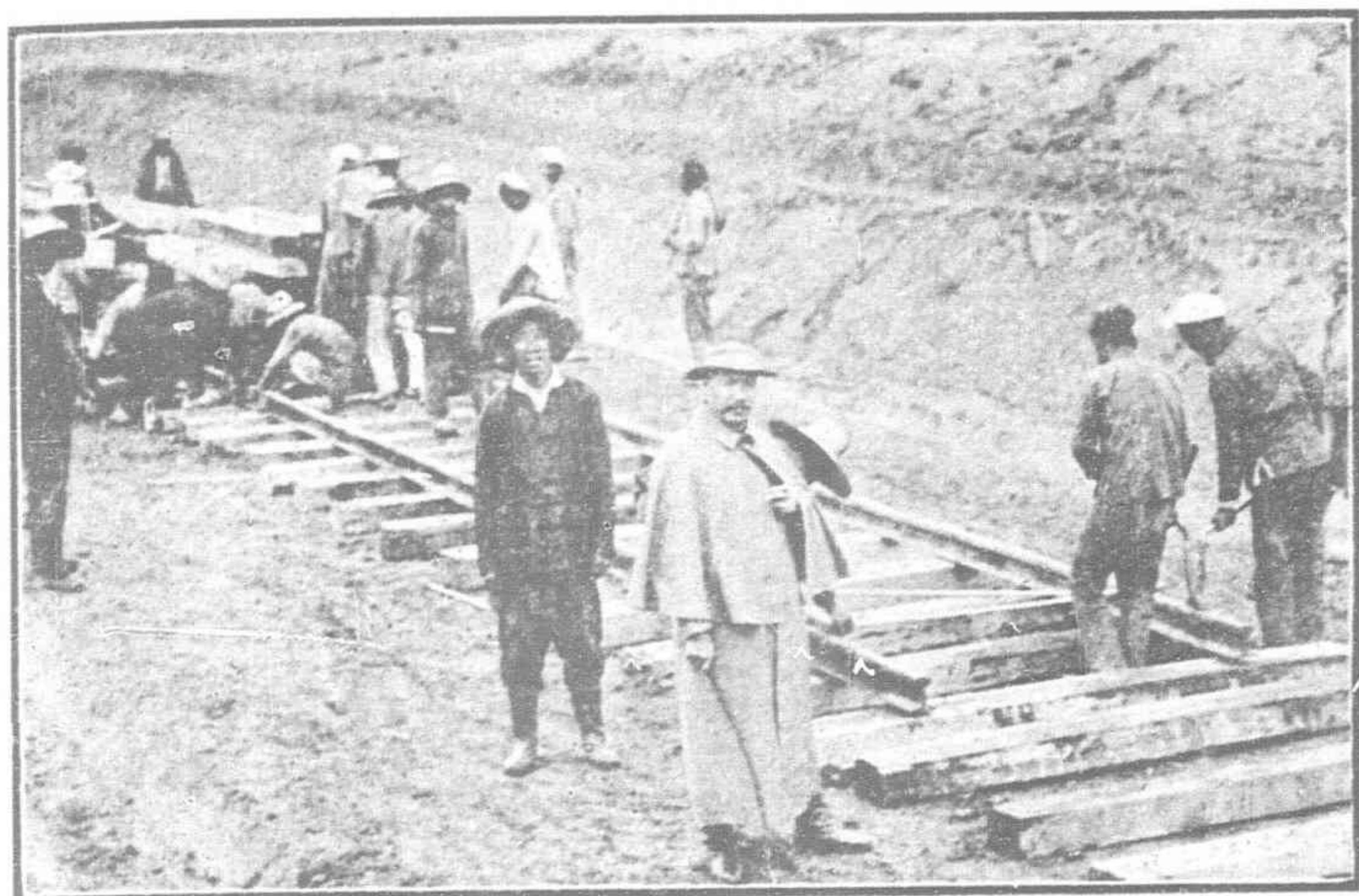
charge of the work on the extension until this time. He was then transferred to Canton; work having been suspended on the extension owing to a change of policy on the part of the then Minister of Communications, Mr. Tang Shao-yi. Mr. Tang felt that the money necessary for the continuation of the line to Suiyuan, or even Tatung, could be better utilised on a line from Kaifeng to Haichow, and when the construction work to Tiencheng was finished the workmen were disposed of.

However, the departure of Mr. Tang Shao-yi from the Ministry of Communications, and the appointment of

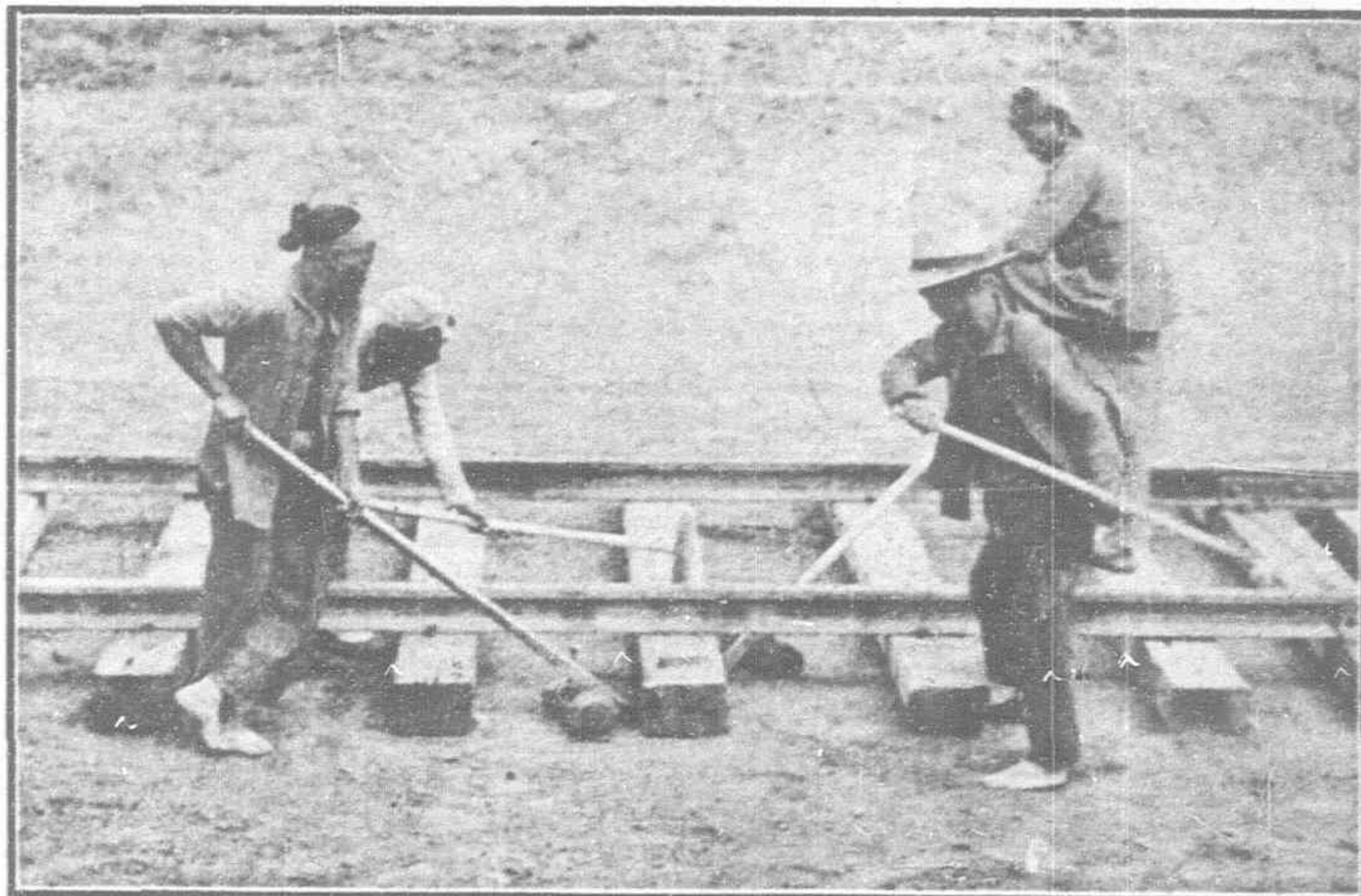


TATUNG-FU BRIDGE

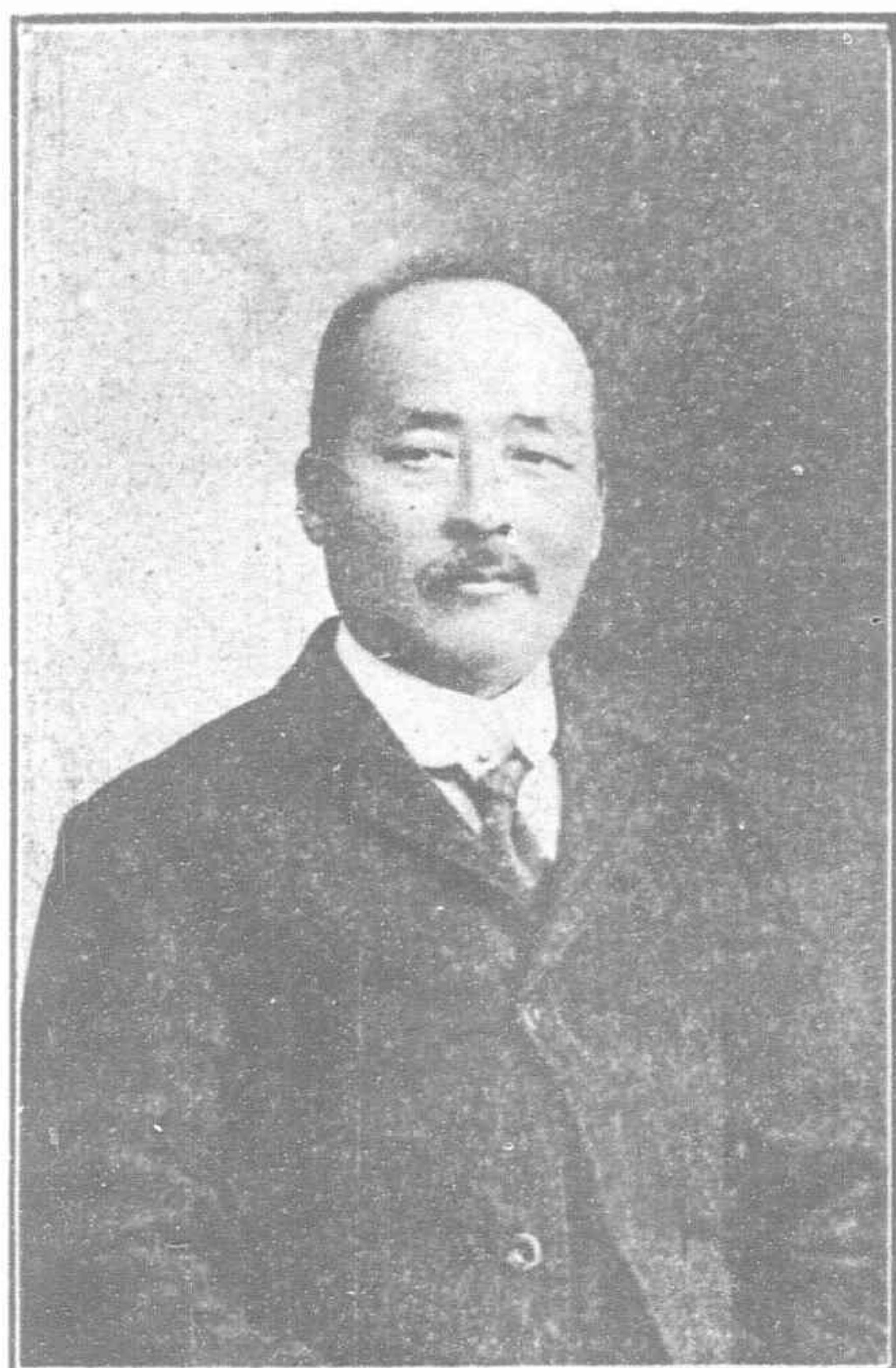
Side elevation of the bridge now being constructed across the Yu River at Taiyuan-fu. It is estimated the concrete necessary for the piers and abutments will be something like 350,000 cubic feet. The total weight of one pier is calculated at 1,209.745 tons, made up of concrete, 1,018.105 tons; track, 92.64 tons; girders, 37 tons; rolling load, 213 tons. The bearing on each pile is calculated at 15.45 tons where there are 34 piles to a pier, and 17.07 tons where there are 76 piles.



PEKING-TATUNG-FU RAILWAY.—Railhead—Mr. K. Y. Kwong, Engineer-in Chief, in foreground



PEKING-TATUNG-FU RAILWAY.—Spikedrivers at work



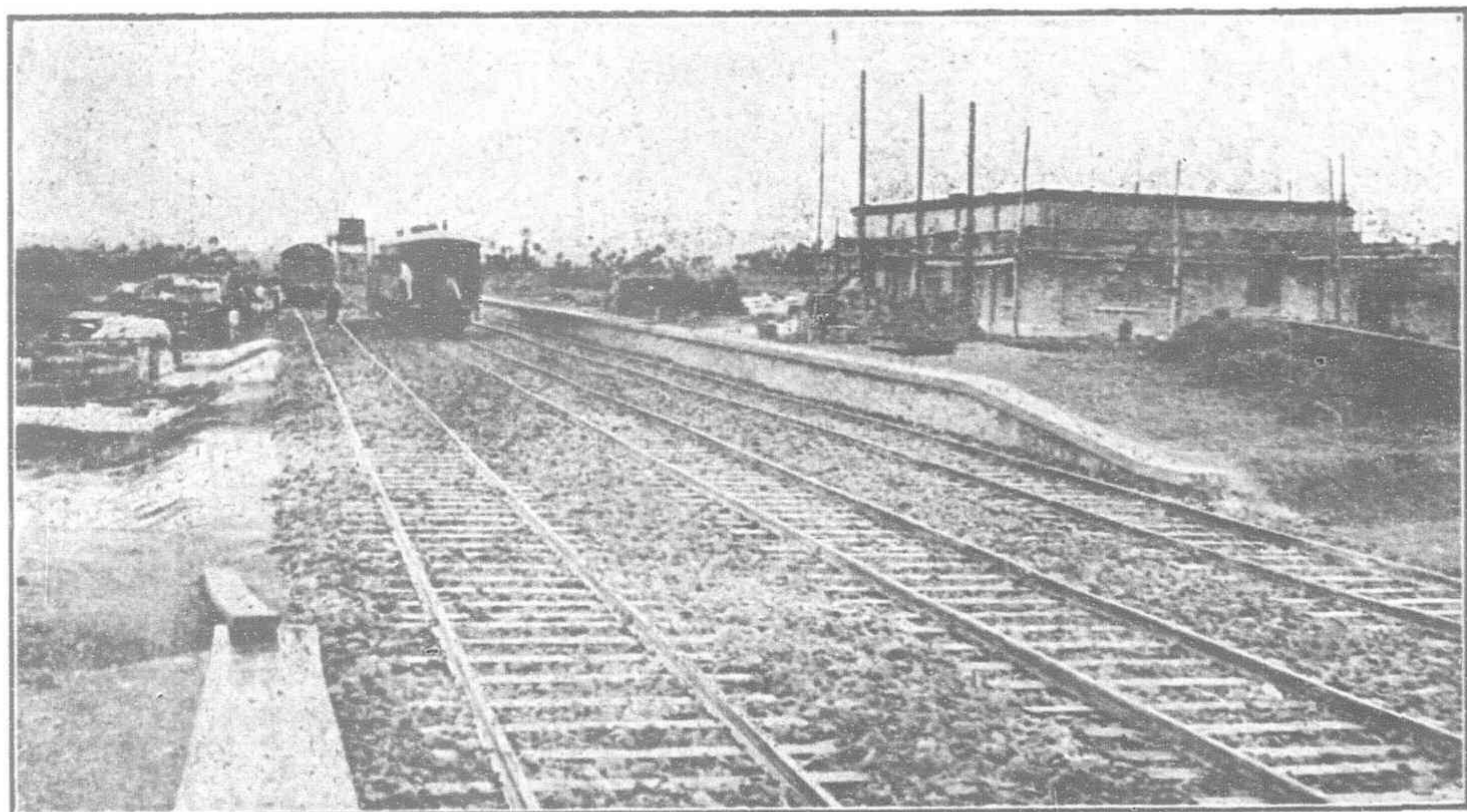
Mr. Chen Shi-lin, Assistant Engineer-in-Chief, Changsui Extension



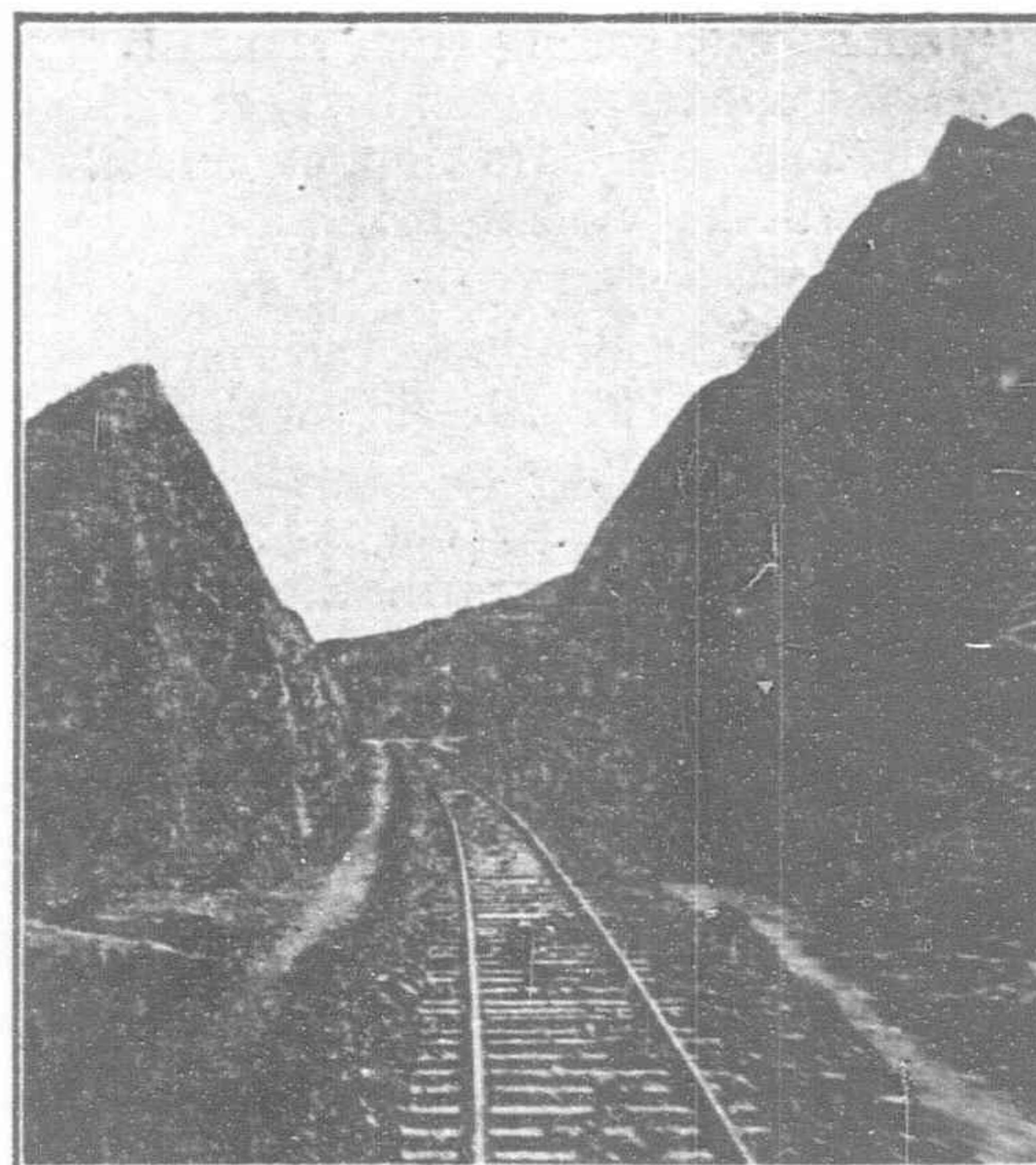
Mr. K. Y. Kwong, Engineer-in-Chief, Peking-Kalgan-Tatung-fu Railway



Mr. Chai Chao-tin, District Engineer, Changsui Extension



PEKING-TATUNG-FU RAILWAY.—The station and yard at Wang-kun-jen-tun, in course of construction



PEKING-TATUNG-FU RAILWAY.—Rock cutting on the bank of the Yang River

Mr. Shen Kung-pao to succeed him, saw a reversal of orders, and after nine months of idleness work was resumed. By October, 1911, the survey had been completed from Tiencheng to Tatung-fu, so when orders were given for a resumption of work in July of 1912 the location was speedily carried out and workmen were engaged at different localities in August.

Mr. K. Y. Kwong was then placed in charge of the extension, and he has held that position ever since with marked ability—as well as being Engineer-in-Chief of the Peking-Kalgan Line.

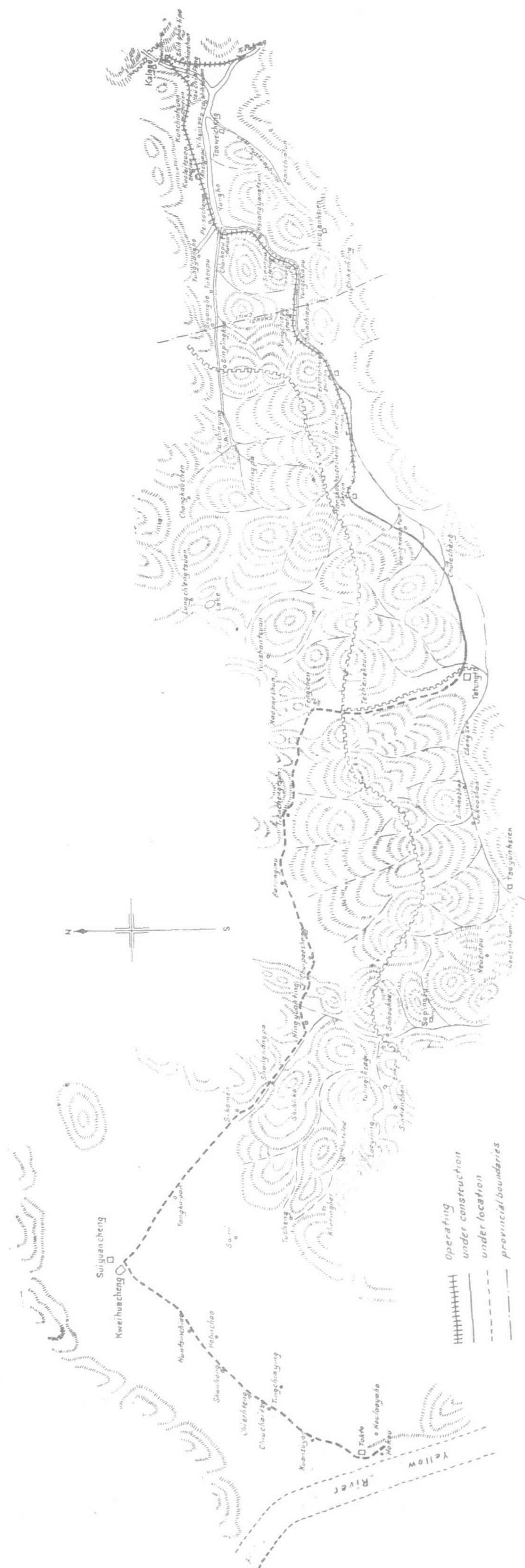
By November of 1911 railhead had reached Yangkuo-hsien, the present terminal station for passengers, and unfortunately work was here again brought to a standstill by the Revolution. Almost a year elapsed before a resumption could be made on even a small section of the work, and it was not till April, 1913, that operations were fully resumed on the balance of the route to Tatung. As many men as available money would permit were employed and railhead is at present in practical sight of Tatung, whilst the roadbed to the river is virtually completed.

Immediately after leaving Kalgan the extension crosses the river over a five span bridge and skirts the hills heading south-west. To the left is an extensive valley under cultivation, which later on merges into other valleys of even wider extent, until the more open country of Shansi is reached.

Heavy rock cuttings, retaining walls and embankments, are a feature of the line for many miles. After the crossing of a fifteen span bridge over the Tan Yang-ho, Chaikowpu station is reached; the old walled city first being seen. Through barren and burnt bridges the route emerges again on the Yang-ho, which it follows a distance of some 35 miles. At the walled city of Yung Chia-pu the first glimpse is obtained of the portion of the Great Wall system which marks the province of Shansi. The wall here is of mud and can be seen threading its sinuous way along the foothills; looking as compact as when first erected, some hundreds of years ago, except in places where the violent mountain torrents have torn their way through.

A few miles from Yung Chia-pu the train runs parallel with the wall and continues so for many miles until that ancient barrier to the Mongols mounts the ridges and disappears in the mountains. A well cultivated valley, which has Tienchen for its principal city and station, is traversed and still on an up grade the line crosses the crests of low hills well above the wide green valley near Yangkuo-hsien. The work in this region is easy cutting or low embankment.

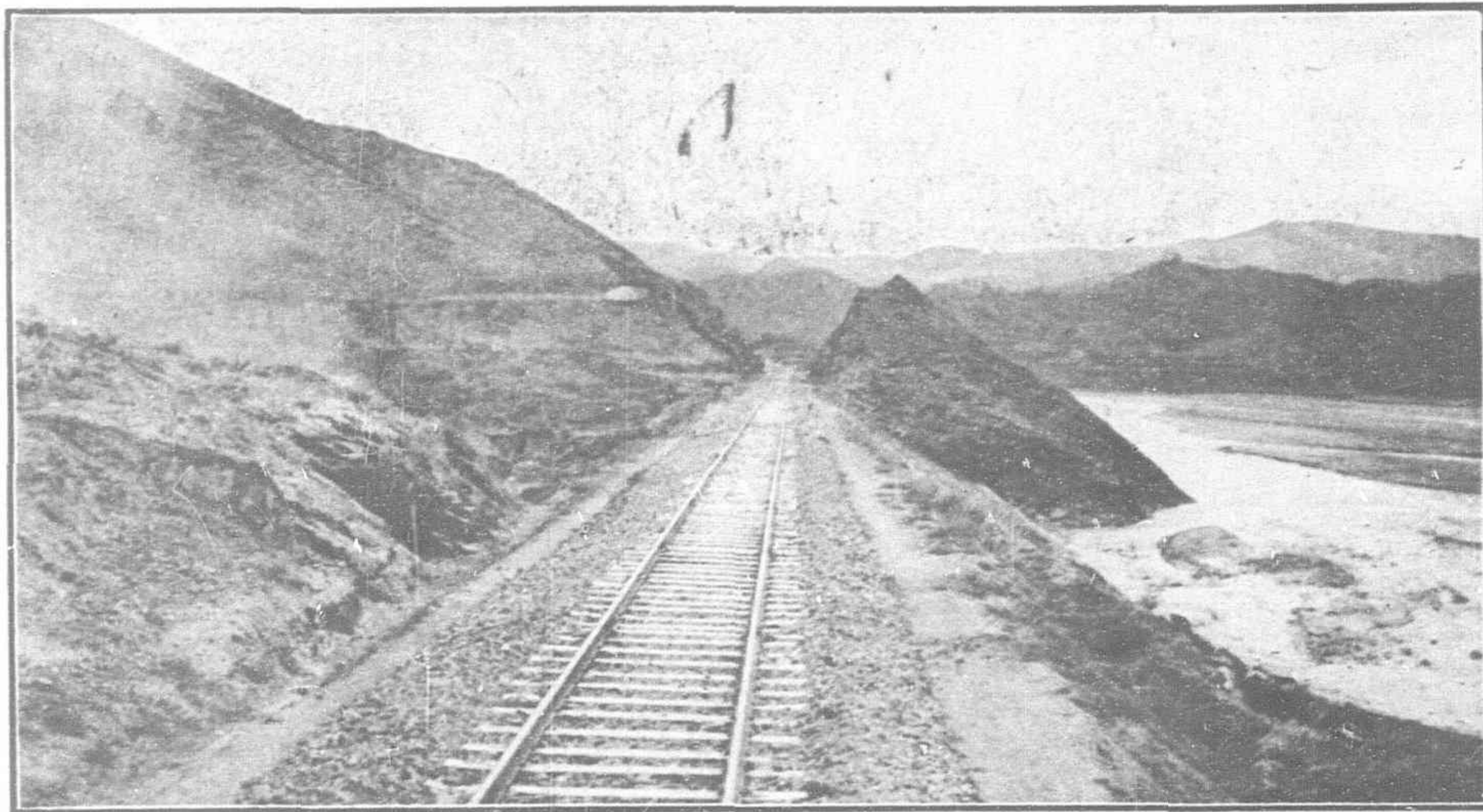
Leaving this station by construction train the line still climbs; this time through a poor country, all cultivated but bearing very poor crops. For per-



THE CHANG-SUI (KALGAN-SUIYUAN) RAILWAY.—This sketch shows the route of the extension from Kalgan to Tatung-fu and the proposed line to Suiyuan and Hokou on the Yellow River. The line will not actually touch Suiyuan. The station will be at Kweihsuacheng, a market town a little to the south.

haps twenty or thirty miles the country is boulder strewn. There are no water-courses here. When the heavy storms come the torrents which rush down from the bare mountains simply sweep over the country covering it with gravel and boulders and in the rainy season provide a constant menace to the safety to the line, which has to be carried on an embankment to prevent burial in silt.

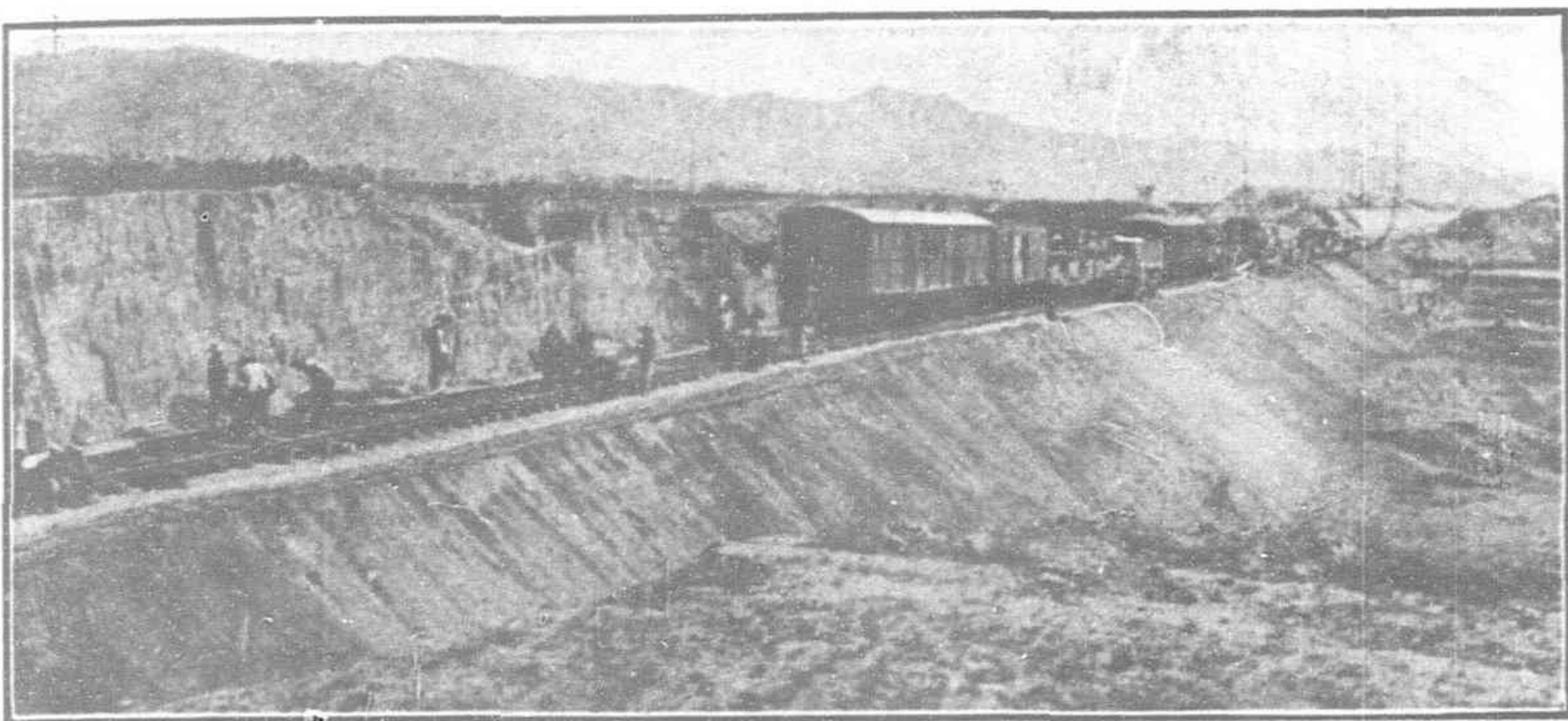
The valley which is kept to the left is now broken by a low ridge which the line obliquely



PEKING-TATUNG-FU RAILWAY.—A glimpse of the country along the Tang River

Yu to Tatung. Most of these cuttings are now completed, and work has already been commenced upon the bridge foundations.

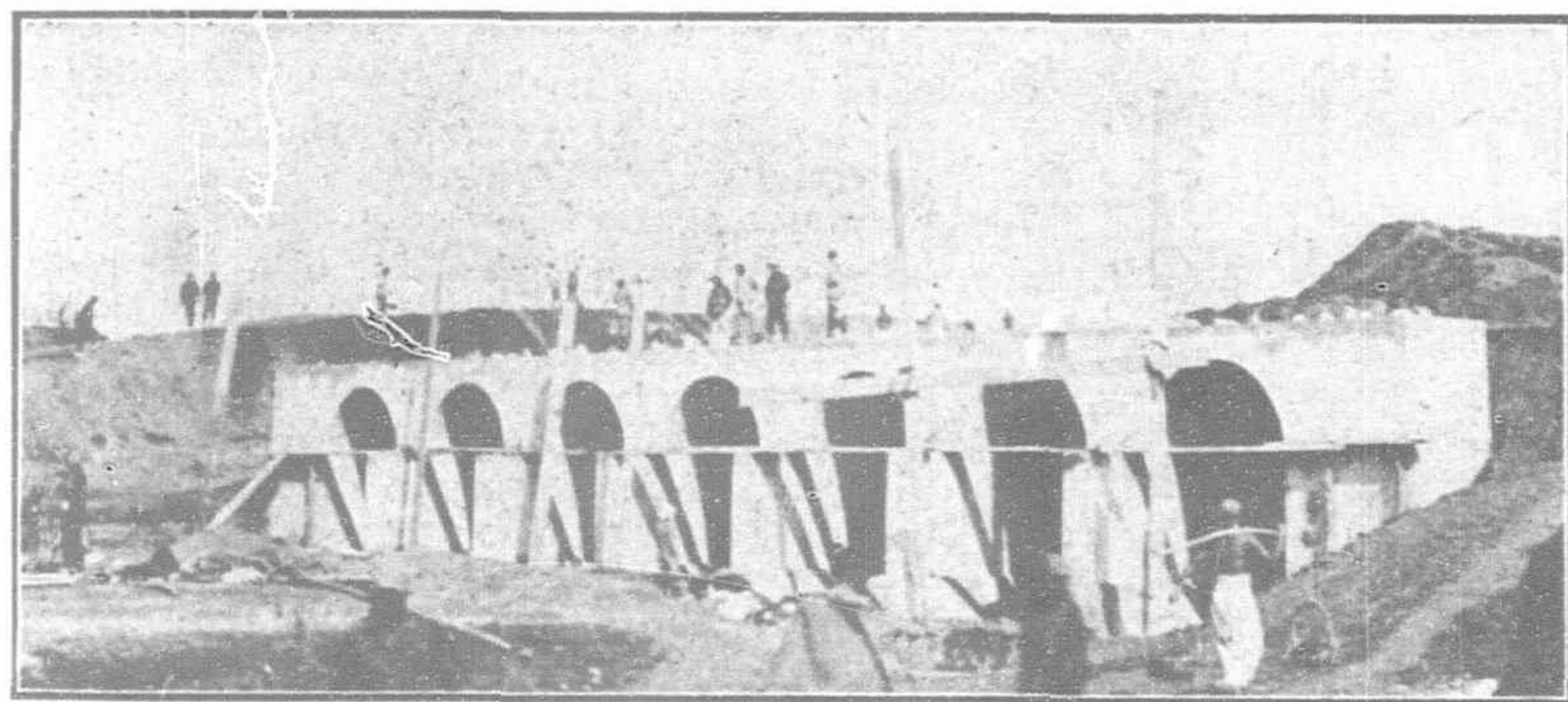
Several pile drivers have been installed on the bed of the river, which contains little water in the dry season, and by the time the rain commenced much work had been completed. Under each pier from 46 to 60 piles will be driven—according to the nature of the ground—Oregon pine piles 33 feet in length being used. Sheathing piles will be



PEKING-TATUNG-FU RAILWAY.—Embankment across a loess chasm at Shao Chia-tsao



PEKING-TATUNG-FU RAILWAY.—Embankment construction on the rolling country near Tatung-fu

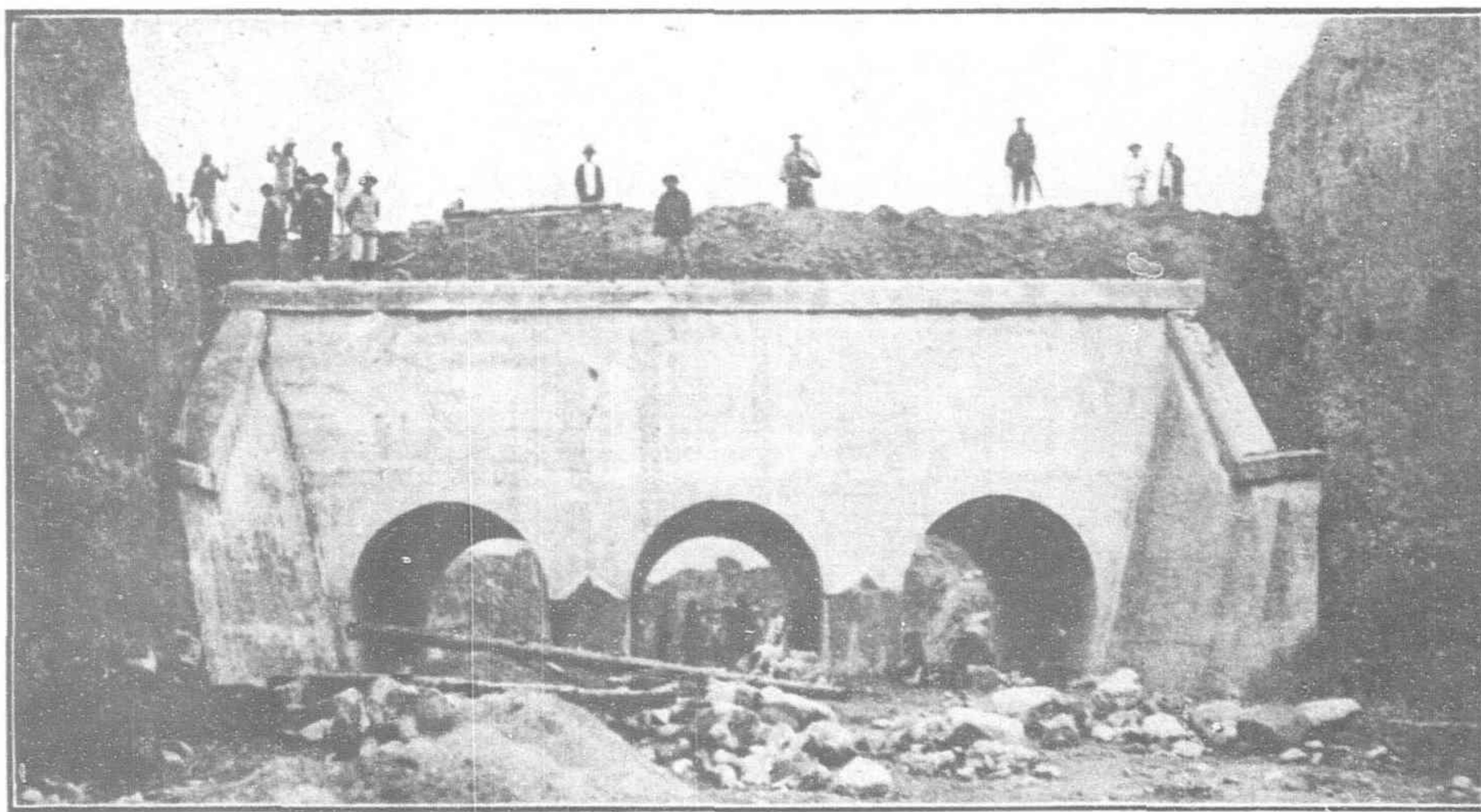


PEKING-TATUNG-FU RAILWAY.—Seven arch concrete culvert at Chu Chia-shao to carry an embankment 55 feet high. The arches are 12 ft. high by 10 ft. wide by 152 ft. long



PEKING-TATUNG-FU RAILWAY.—Excavating a cutting near Tatung-fu

crosses, the crest (4,800 ft.) being the highest point on the route. The station here is called Shao Chia-tsao, which is reached through a cutting, and then the descent to Tatung takes place over rolling country and across numerous loess clefts which score this region. These constitute the greatest difficulty, for otherwise the line is easy of construction. One or two deep cuttings through loess and, as the river is neared, through gravel, are necessitated to reduce the height of the bridge which will cross the river

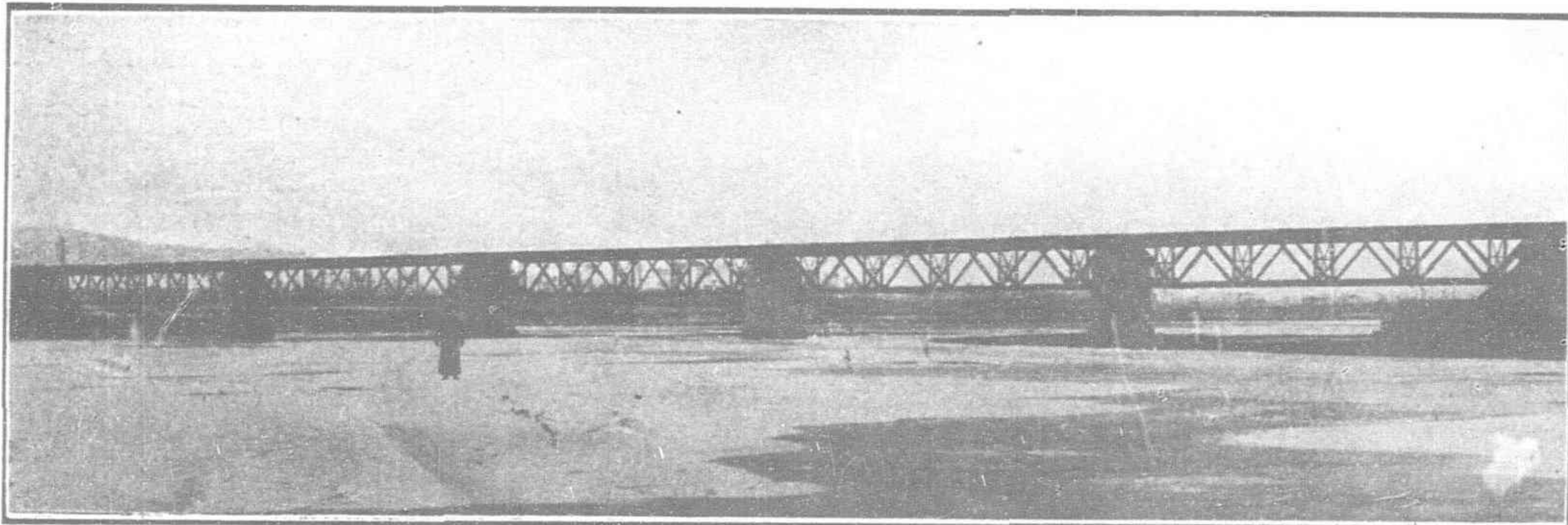


PEKING-TATUNG-FU RAILWAY.—Concrete culvert at Sha Chia-tsao. The arches are 10 ft. high, 10 ft. wide and 38 ft. in length. An embankment 13 ft. high carries the rails across the loess chasm

driven round these and with the excavation of the gravel the piles will be sawn down to permit of a foundation of ten to twelve feet of concrete being laid to carry the piers.

The bridge will, as stated before, be carried on seventeen concrete piers, and the track will be 52½ feet above the bed of the stream. An accompanying illustration furnishes details of the structure. It is expected the bridge will be completed by the end of spring.

The bridge carries the line to the east of Tatung-fu city, which lies



PEKING-TATUNG-FU RAILWAY.—The bridge over the Sin Yang-ho

a few hundred yards away within its decaying walls. It is the centre of a large cereal raising, coal-bearing region, and is the distributing city for a large trade to Mongolia, via Kweihwacheng and Suiyuan. The station will be established on high land at present under cultivation, but until the bridge is completed the traffic will be handled from the opposite bank of the river. It is fordable at all times of the year except in the flood season, when it rises from a foot up to twenty-five feet and more. The great height of the bridge is not necessitated by the probable flood level, but by the high country through which the line approaches the river.

The line has been surveyed as far as Suiyuan, and the surveyers report that its construction will entail very heavy work in cuttings and tunnelling. So far the Government has decided not to proceed, and unless financial affairs rapidly brighten Tatung-fu will be the terminus for a considerable period.

Even as it is the railway will cause Tatung to increase rapidly in importance. Lignite coal now sells in the city for as low as one dollar per ton, and a branch line to the mines in the hills close to the city should deliver the fuel to the railway at a very low rate.

Tatung-fu will also profit by the fact that it will be the junction with the line projected to connect with Taiyuan-fu.

Mr. K. Y. Kwong, the engineer-in-chief, has a loyal and capable engineering staff. Mr. Chan Si-lin is the assistant engineer-in-chief, while Mr. Cha Chao-lin is in charge of the construction on the second division from Tiencheng to Tatung. He has with him Messrs. Liu Chi, Wei Hsen-wu, and Shao Pao-cheng. Mr. J. F. Yu is in charge of the first division, now open for traffic.

Mr. K. Y. Kwong (Kwong King Yang) is an American educated student, who has proved that the Chinese are able to apply Western learning efficaciously and economically. He is keen on his work

and takes a remarkable personal interest in all details. He went to America in 1874 with the first group of Chinese

Mr. Liu Chi,
Resident Maintenance Engineer, Changsui Extension

students, and after a period of private tuition entered the East Hampton (Mass.) Grammar School. Two

years later he graduated from Williston Seminary, and entered the Massachusetts Institute of Technology, where he was compelled to discontinue his studies by the recall of the Commission with which he was connected in his studies. Upon returning to China, however, he decided to continue in touch with engineering and entered the employ of the Kaiping Coal Mining Company, resigning three years later to join in the construction of the Peking-Mukden railway. He rose to resident engineer, and when the Peking-Kalgan line was commenced he was made District Engineer of the construction of the Nankou Pass section, the most difficult piece of work in North China. Subsequently he was given control of the Canton end of the Canton-Hankow railway, and by 1911 had placed seventy miles of line in operation. He then returned to the Kalgan line as engineer-in-chief, and it has been the adoption of his advice that has brought that system from a losing to a paying one. At the time of the Revolution he was requested to take up the Director-Generalship of the Changsui Extension as well as the duties of Engineer-in-Chief, but that he declined, and proposed that Mr. M. C. Kuan, the Director-General of the Peking-Kalgan line, should act in both capacities.

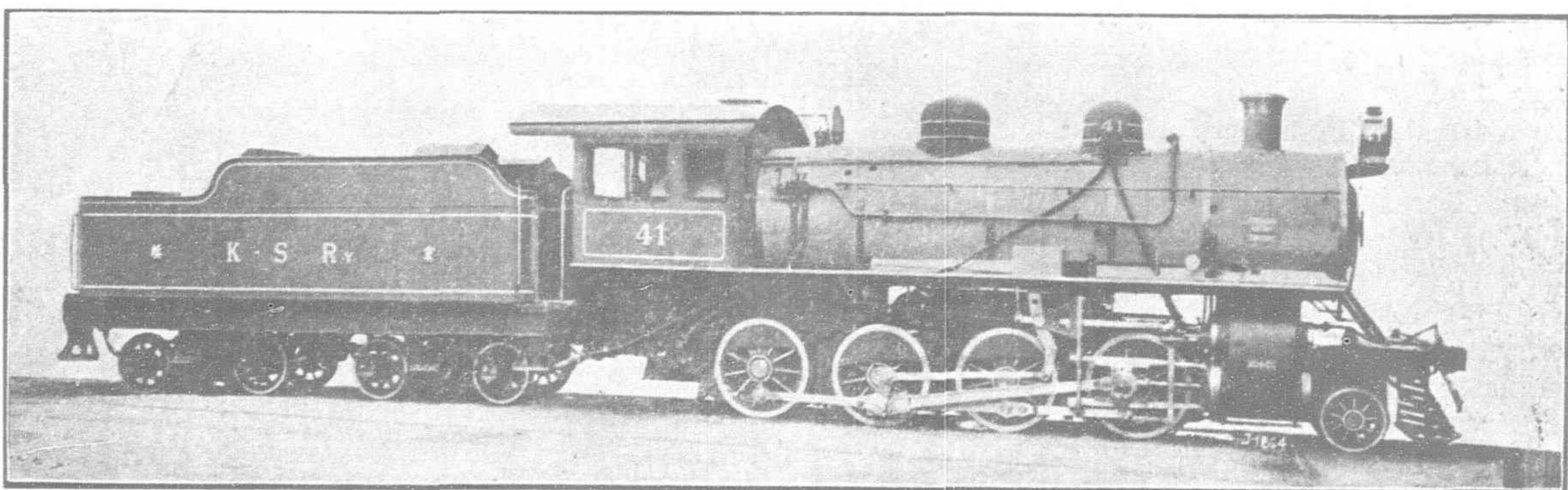
(Continued on page 88)

AMERICAN ELECTRICAL SUPPLIES IN JAPAN

The sale of American electrical machinery and supplies in Japan during 1912 was the largest in the history of this line of business in the Empire; reports Consul-General Sammons. The total sales of electrical supplies for the year aggregated over \$5,000,000, the bulk of the imported products coming from America. The importation of all kinds of machinery into Japan increased about \$1,500,000 during 1912, the total, in round numbers, being \$14,150,000.

There are in Japan several British manufacturers who have a fairly large electrical business, but the Allgemeine Co. and the Siemens-Schuckert Co. are the two large German competitors of the American manufacturers of heavy electrical machinery and supplies.

The principal business during 1912 consisted of the extension of existing light, power, and railway stations. The Tokyo Municipal Railway, for instance, purchased \$300,000 worth of apparatus for transforming high-tension current in their various sub-stations throughout the city to the trolley voltage.

STANDARD PEKING-KALGAN FREIGHT LOCOMOTIVE.
Designed and constructed by the American Locomotive Company

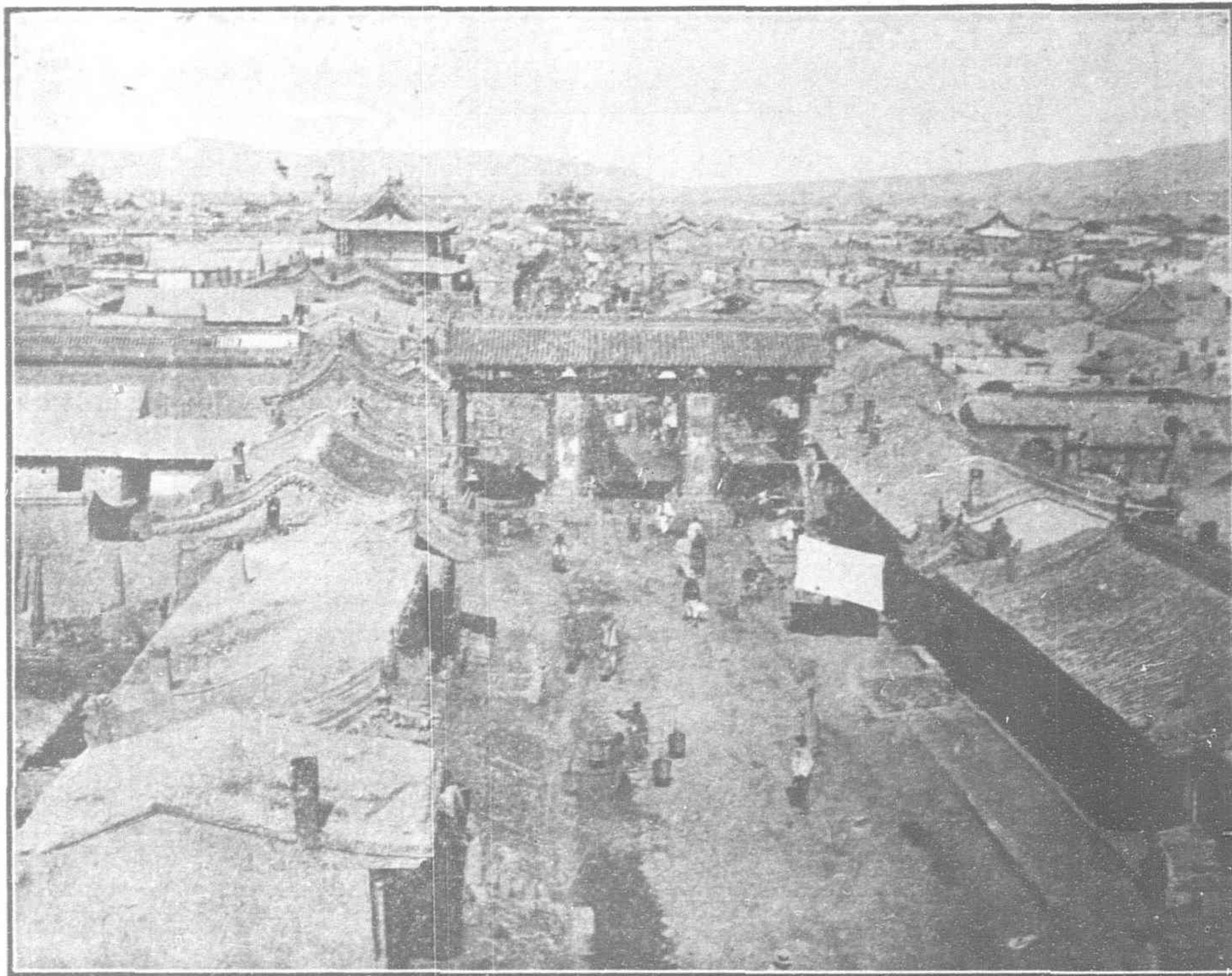
ELECTRIC WATER-POWER PLANT

The machinery ordered about a year ago to Tokyo for various large water power-electric companies has been arriving during the past few months and the plants are being completed. The principal ones are as follow:

Tokyo Electric Light Co.—An extension of about 40,000 kilowatts to their first water-power electric plant which amounted, when it was installed, to approximately 20,000 kilowatts. This extension is now about finished.

The Kinugawa Hydroelectric Co.—Approximately 40,000 kilowatts. This plant is now about completed and some current is already being generated to Tokyo from its power stations.

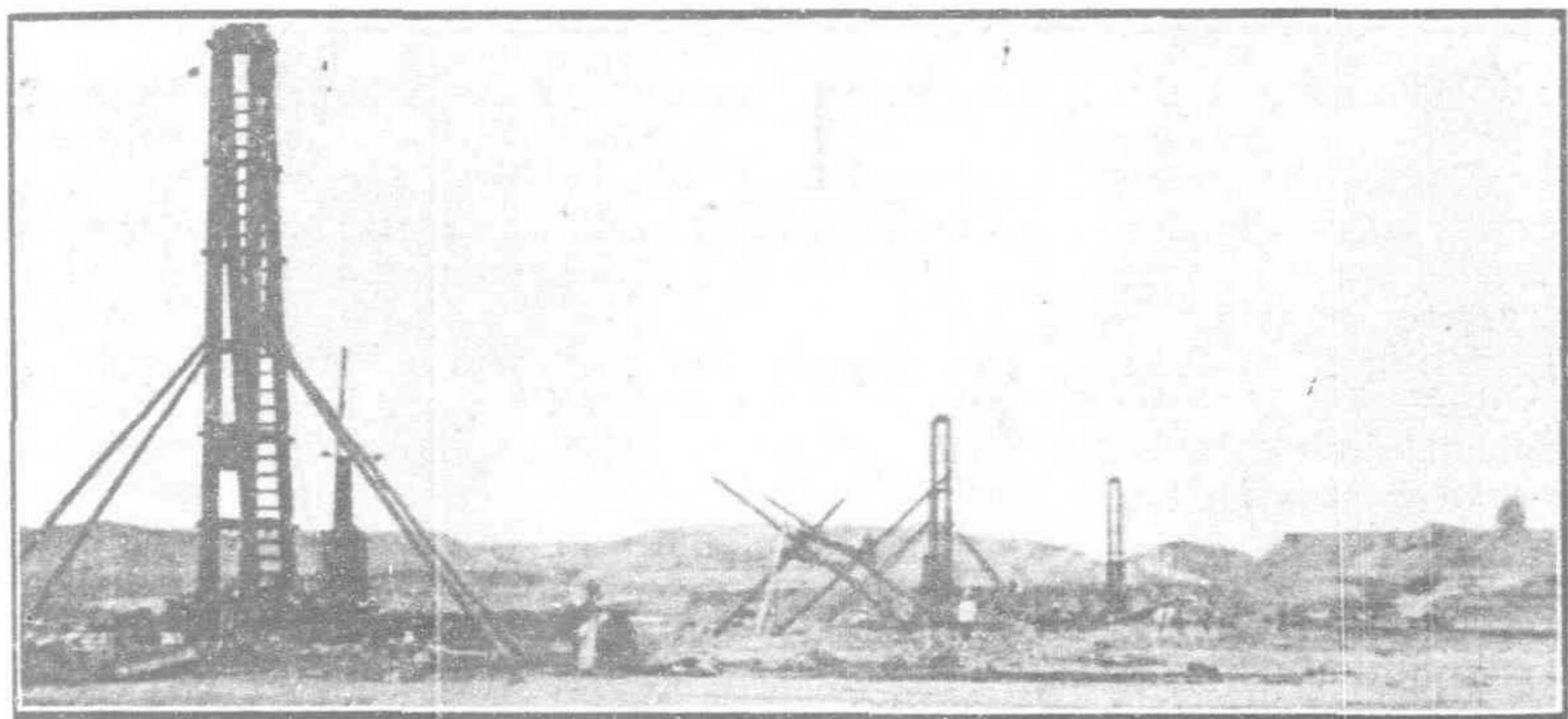
Katsuragawa Hydroelectric Power Co.—This equipment complete was supplied from Schenectady, N. Y., the aggregate capacity being about 40,000 kilowatts. All of the machinery has arrived and the work will probably be finished within the



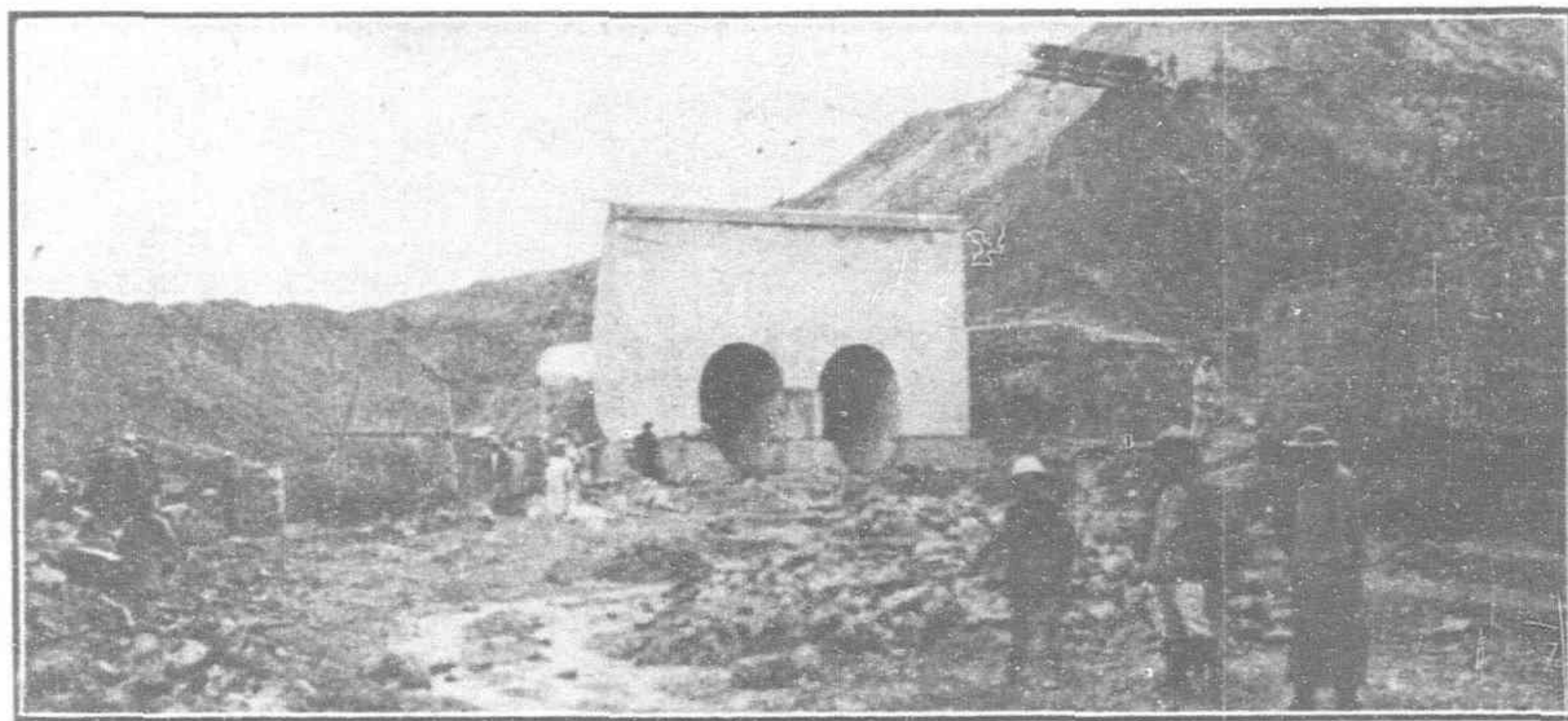
PEKING-TATUNG-FU RAILWAY.—A view in Tatung-fu from the top of the wall

the incandescent lamps used in the Empire. This plant is operated through a Japanese company under American control. It is managed entirely by Japanese, however, and the operatives are largely Japanese girls. It has been very successful both financially and in supplying the demands of the country. In fact this is a new industry created in Japan within the last three or four years.

The General Electric Co. also owns a considerable interest in the Shibaura Engineering Works at Tokyo, which is controlled by the financially powerful Mitsui Co. The Shibaura works manufacture electrical apparatus up to 2,000 kilowatts, and the business for the past six months was so satisfactory that the company has decided to increase its capital from the present \$1,000,000 to \$2,000,000 to take care of the demands of the market here. There is close co-operation between this company and the parent General Electric Co. of Schenectady, N. Y., and



PEKING-TATUNG-FU RAILWAY.—Pile drivers in the bed of the Yu river at Tatung-fu



PEKING-TATUNG-FU RAILWAY.—Concrete culvert at the Hsi Tsoi-tze to carry embankment 63 feet high. The arches are 10 ft. by 10 ft. by 175 ft.

next few months, so that a large amount of power from that source will shortly be brought down to Tokyo.

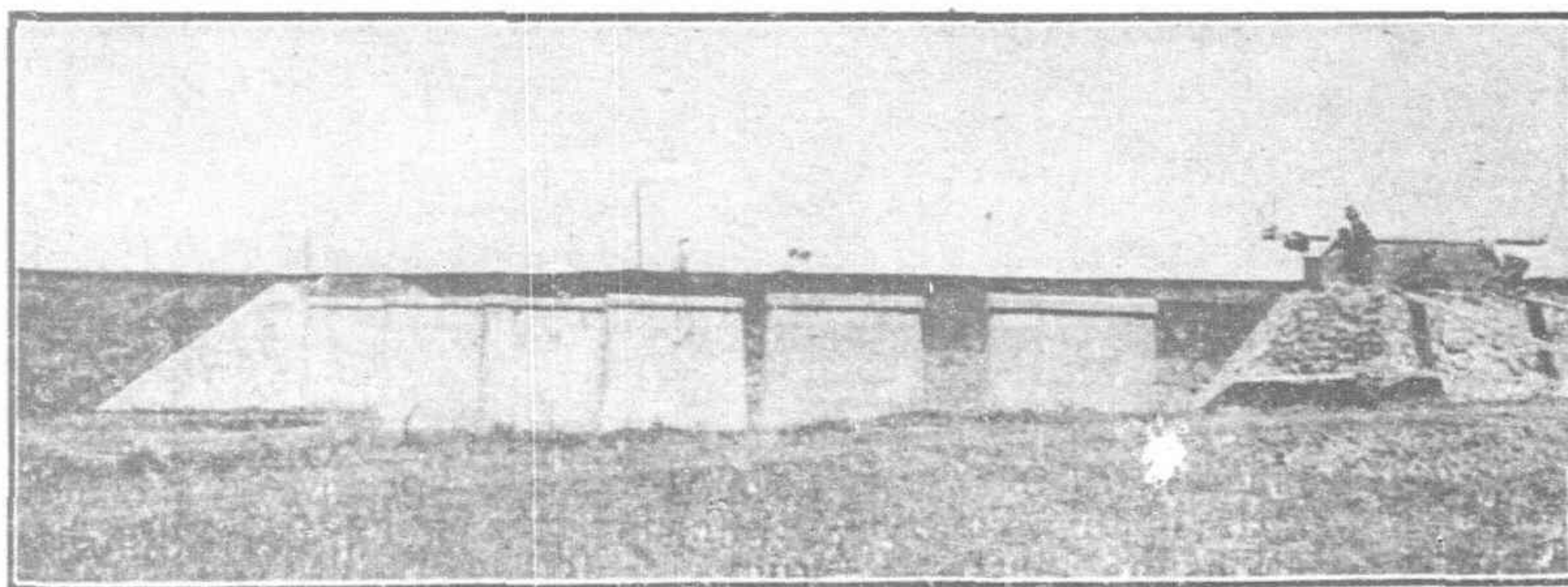
The Inawashiro Hydroelectric Power Co.—The order for this apparatus, amounting to about 40,000 kilowatts, was placed about one-half with an English firm (the Dick Ker Co.) and the other half in America (Westinghouse.) This apparatus has not been shipped yet, and that company will therefore not be ready for operation until after the end of this present year.

At Yokohama a 3,000 kilowatt steam turbine generator was installed further to increase the capacity of the existing lighting plant.

At Osaka there have been many additions to the existing electric railway plants and some small suburban roads have been put into operation in the last four or five months. Osaka is a very active centre for the electrical business in Japan, and many suburban roads have been successfully put into operation there. On account of the large manufacturing interest developed, electric power will be largely used there in the future, and as there is a large water-power company, the Ujigawa, which is now nearing completion, and which will bring into Osaka 30,000 to 40,000 kilowatts of current, the prospects are favorable for low cost light and power in that city in the future.

OTHER BUYERS OF ELECTRICAL MACHINERY

The Kyushu Electric Railway added during 1912 a 3,000 kilowatt turbo generator set, and at Nagasaki two 500 kilowatt turbo generator sets were installed as an extension to the existing lighting plant. The coal mines in Kyushu have also been active in purchasing electrical apparatus.



PEKING TATUNG-FU RAILWAY.—Bridge at Shang Yu-chien. Steel girders; six spans of 30 ft. each, height of piers 17 ft.

The major part of the sales reported have been made through the General Electric Co. of America. In addition to the extensive business of selling American electrical machinery, the General Electric Co. is a leading factor in the electric lamp supply trade in Japan. It has developed a very large lamp manufacturing plant at Tokyo, which now supplies the great bulk of

there is apparently no reason why this Japanese electrical manufacturing concern should not become very strong and prosperous here. All of its products are manufactured in accordance with the American designs of the General Electric Co.

Large quantities of the smaller electrical supplies are imported into Japan, and in this business American manufacturers and importers participate very satisfactorily. It is evident, however, that the Japanese will be able, particularly through foreign associates, to manufacture the greater part of the smaller electrical supplies, including telephones and telephone equipment. The manufacture of this class of smaller electrical products in Japan is growing steadily and rapidly.

ACCORDING to a contemporary a wooden tire has been invented for motor vehicles. It is formed of sections of ash bolted on to the rim in two, three or four rows, according to the weight of the vehicle. Each block is provided with a steel cleat to prevent it from being split by stones on the road. If one block is damaged a new one can be easily substituted. It is claimed that these wooden tires possess an astonishing degree of elasticity. Experiments carried out with them on both light and heavy vehicles are stated to have been highly satisfactory.

MINING ADMINISTRATION IN CHINA

The *Mining Journal* writes:—

The future development of a great mining industry in China is a theme upon which many engineers who have visited the country have been wont to discuss, and with its enormous population and great deposits of coal there seems every reason to expect in due course the growth of a very large home market, and possibly, if capital does not become permanently scarcer, the creation of important industries doing a large export trade. Whether the mineral riches of the country are as great as in their present little known condition they are generally assumed to be or no, there can be no doubt that the anxiety displayed by European capitalists to acquire mining concession has awakened Chinese interest in the country's latent wealth, and is no doubt largely responsible for the hostility with which native opinion of late has come to regard the alienation of mineral concession to foreign concerns. The day, however, has gone by to oppose mere negation to the advancing capitalist, and as the necessity for foreign finance becomes increasingly realised a knowledge of what the country has to offer in the way of unascertained assets is more generally felt. Some tentative efforts have been made to meet the general native ignorance of mining in a modern sense from which China suffers by the formation of the Tongshan school with which the Chinese Engineering and Mining Company was associated, and by the creation of a geological department in the Peking University; but no systematic attempt, so far as we are aware, has been hitherto attempted to create a mining department to study the resources of the country, create a technical administration, and train a body of professional engineers. According to particulars contained in a pamphlet recently issued by the Minister of Industry and Commerce, and to observations explanatory of the circular contained in a recent issue of the *Far Eastern Review*, a more or less complete scheme has been evolved, which is of much interest not only as regards the prospects for China herself, but also as a practical commentary on the various features of mining administration in different parts of the world, since in a case of this kind there can be no doubt that imitation is the sincerest flattery. It is proposed to create three distinct entities, called the Mining Academy, the Prospecting Corps, and the National Mining Association; while, owing to the fact that China is in the fortunate position of being able to create the foundations of a national mining service unhampered by any pre-existing organisation, these various departments would have an integral connection. The Mining Academy, to treat of these departments in their logical order, will take students who have passed the middle school course and give them a three years' course consisting partly of class and partly of field work. A start is to be made with thirty students, who will select either a mining or geological course. The staff of the Academy is to consist of a president and four professors, two of whom must be foreign. These professors will spend half the year in prospecting work and half in teaching. Graduates from the Academy will receive the title of M.E., and will then be eligible for the second branch of the national organisation—the Prospecting Corps—after three years' work, in which they may be appointed Technical Experts. It will be seen that the object of the scheme is to create in as short a time as possible a large body of trained men who can undertake a geological survey of the vast territories contained in the Chinese Empire. It is proposed to divide the country into three categories: Districts which are rich and easy of exploitation, districts where communications are easy, and districts where communications are poor and mineral prospects unattractive. At the present time it is estimated in the broadest outline that one-tenth of the country answers to the requirements of the first class, three-tenths to those of the second and six-tenths to

those of the third. Allowing a period of fifteen years, it is hoped that it may be possible to collect reports and specimens and map the country in greater or less detail on the principles outlined, and thus afford a basis upon which the Government and people of China may be able to embark on mining on an intelligent basis. In addition to the Academy and Prospecting Corps, the third body to be formed, the National Mining Association, is no less important. Its members will be drawn from the proprietors of mining companies and others engaged in mining work, students who obtain their mining degree, and capitalists who are connected with the mineral industry. This Association will act as the adviser to the Government in mining matters, maintain a laboratory, make a comparative study of mining generally, create a publicity department embracing monographs, practical text-books and a periodical mining magazine, and finally establish a sort of appointments' board and a bureau for investigating claims preferred for State assistance by province or districts. Owing to conditions in China, and in consequence, perhaps, of a study of the trend of modern developments in the more advanced mining countries, it is assumed from the first that private capital will be inadequate to deal with the capital requirements of the mining industry, and that much will have to be derived from the Government, which in its turn will have to have recourse to foreign loans. Consequently, the responsibility thrown upon the department responsible for approving or rejecting any claims will be a considerable one, and the necessity of reliable technical advice indispensable. That the teachings of mining history do not go altogether unread in China is somewhat amusingly illustrated by a reference to Australia. Australians, as we are told, are fond of saying that the gold output of their continent in the past fifty years would have sufficed to build a triumphant arch of the precious metal, but the capital required to produce this would furnish two such arches, and the lesson is drawn that if the exploitation of the investor has been so great in a rich country where people are to some extent familiar with the industry, the dangers of exploiting the public in a country like China are greater still.

Among the new departures initiated by the recently organized Republic of China, one of the most commendable is the proposed organization of a bureau for systematic study of the mineral resources of the country, says the *Mining and Scientific Press*, and continues:—One of the most critical problems of the new republic is that of national finance, which is closely bound up with national prosperity, which in turn rests upon the development of natural resources, agricultural and mineral. Much has already been done in unsystematic fashion, and the general features of the geography, geology, and mineral resources of China are fairly well known through the studies of a succession of explorers and students, beginning with Marco Polo and extending down to the present. The most important work was done by Baron F. von Richthofen and the geologists attached to the 'Mission' of the Lyons Chamber of Commerce. The United States bore honorable part in this pioneer work through the explorations of Messrs. R. Pumpelly, Bailey Willis, and others. The need for systematic and continuous study as an aid to right development is obvious, and the new government is to be commended for the promptitude with which it has taken up this matter.

The method of organizing as so far announced, seems less commendable. It is proposed to found, under the Ministry of Industry and Commerce, a Mining Academy to be situated in Peking and to consist of a president and four professors, two of whom are to be foreigners and two Chinese, and it

is interesting to note that, following the plan suggested by Mr. T. A. Rickard some years ago, the professors are alternately to teach one-half of the time and to spend the other half in the field. The graduates of the Academy are to be organized into a Prospecting Corps which will study the mineral deposits of the various provinces and map them in order to determine which are most worthy of immediate development. It is apparently taken for granted that government aid will be asked in the development of mineral deposits, and one of the functions of the new bureau will be to pass upon the validity of such requests as well as to prevent the organization of swindles. The conjunction of teaching and geological surveying presents various disadvantages, and is evidently proposed in order to build up a corps which has been trained under the supervision of the heads of the organization. Little is to be gained by such a method, and much is sacrificed. The number of Chinese young men who have already been trained in geological and mining work, chiefly in foreign countries, is ample to furnish the personnel of such an organization, and the training of raw recruits only leads to unnecessary delay in bringing the institution to a stage where it can do effective work. In addition, all previous experience goes to show that educational institutions in Peking are unpleasantly accessible to official interference, to the great detriment of their work. The director of the new bureau is to be Mr. Esous Chang, and the mining professor Mr. C. Y. Liu, a graduate in 1911 of the School of Mines of Columbia University. Both of these gentlemen are guilty of "the crime of being young" and are accordingly lacking in the previous experience which the organization of a survey of a country larger than the United States would seem to demand. On the other hand, it must be remembered that Clarence King was also a very young man when he led the way in similar work in this country, and we hope Messrs. Chang and Liu may meet with a corresponding degree of success. A further proposal, which is excellent, is the organization of a National Mining Association, which is to combine the functions of the Institute of Mining Engineers and the Mining and Metallurgical Society in this country, and is to co-operate with the Academy and Prospecting Corps. Any work which these organizations are able to do will be for the advantage of the newest of republics, and we wish them Godspeed.

PEKING-KALGAN-TATUNG-FU RAILWAY

List of Important Bridges on Changsui Extension

(Continued from page 86)

Tung Chiao Ho bridge, at Kalgan, 5 deck spans of 100 ft.

Ta Yang Ho bridge just East of Tsai Kou Pu Station, 16 deck spans of 100 ft.

Siu Yang Ho bridge, also East of Tsai Kou Pu Station, 7 deck spans of 100 ft.

At Chung Kao Chuang

7-10 ft. arch culvert and embankment filling over top of arch is 62 ft.

At Hsichuitze

Double 10 ft. arch culvert embankment filling over top of arch is 63 ft. high.

At Tatungfu, Yu Ho

17-deck spans of 100 ft. height of pier from river bed is 54 ft.

ANOTHER BELGIAN RAILWAY

FROM SOUTH TO NORTH OF SHANSI PROVINCE

The Chinese Government has signed an agreement with the Belgian concern known as "Compagnie Générale de Chemin de Fer et de Tramways en Chine" for the construction of a railway longitudinally through the province of Shansi.

Such a railway will connect the mid-land trunk line (the Lung-Tsing-U-Hai), now being built with loan funds supplied by the same Company, with the Peking-Kalgan extension at Tatung-fu.

The junction of this newly projected line with the Lung-Tsing-U-Hai railway will be at Tung-kwan, in the extreme south-west of Shansi. The route will thence run north by east to Taiyuan-fu (the Capital of Shansi province and the present terminus of the railway from Cheng Ting-fu, on the Peking-Hankow trunk line). From Taiyuan-fu it will continue in a northerly direction to Tatung-fu, which, in a few months, will be the railhead of the Chang-sui Extension of the Peking-Kalgan line described elsewhere in this issue.

An important aspect of this agreement is that the Company have the option to extend the railway in the south from Tung-kwan to Chengtu, the capital of Szechuan.

With the extension the line will be some 960 miles in length.

No railway in China are likely to have such an important bearing upon the political future of the country as these two routes which have now come under the dominance of the Belgian financial organisation named in the first paragraph of this article.

Apart from its political bearing, however, the projected railway will place in the hands of the Belgian syndicate the greatest amount of mileage held by any individual nation in China, and the two routes will embrace an area of country of tremendous importance to Russia, whose financiers are alleged to be interested in the Compagnie Générale de Chemins de fer et de Tramways en China.

Considered from a purely economic standpoint the proposed line is likely to have a tremendous influence upon the development of one of the richest mineral bearing provinces of China. It is set down as a fact that Shansi possesses coal fields more extensive and richer than any other like area of the world, while iron exists in great abundance. From an agricultural point of view the products are confined to a great extent within the valleys of Taiyuan-fu and Kiang-chow, and consist mainly of corn, tobacco, cotton and sometimes rice. The climate is too severe to obtain two harvests per year, so Shansi is compelled

to procure from the neighboring plains the products it lacks itself.

The engineers are liable to find the railway one difficult to build—or at least expensive. Shansi is mountainous throughout, a plateau ascending in gradual terraces and intersected by mountain ranges towards the North. It has long monotonous ridges of yellow land and several alluvial plains very rich and fertile. The chief mountain ridge inclines gradually from north to south, forming a plateau which varies in elevation from 2,600 to 5,000 feet, being flanked on the east, north-east, and north by peaks which rise to a still higher altitude. Its steep slopes have been deeply furrowed and eroded, and disclose to the eye at the present day the calcareous and coaly deposits which constitute its base. On the north long chains traverse it from south-west to north-east, and continue the massive crest of the southern Ordos table-land. These attain an elevation of 3,600 feet. Running along the left bank of the Fen-ho in the south is the Ho-shan range, which rises to a height of 7,860 feet.

In the centre of the province there exists a series of depressions inclining in the direction of north to south and separated from each other. These are the dried up beds of former lakes, which have disappeared, leaving behind a thick alluvial sediment more fertile than the surrounding loess or yellow land. There are seven of these "lakes," and upon their principal sites stand the cities of Tatung-fu (3,900 feet high), Taiyuan-fu (2,600 feet high), and Ping Yang-fu (1,800 feet high). The southernmost, that of Hsiai Chow, attains an elevation of only 1,200 feet.

For a considerable distance on its progress northward the proposed railway will undoubtedly follow the valley of the Fen river. This is the largest stream in Shansi. It rises north of Taiyuan-fu and enters the Yellow River in the south of the province after watering the most fertile part of Shansi. It crosses the two richest plains of Shansi, those of Taiyuan-fu and of Ping Yang-fu. Its waters frequently rise suddenly and devastate the adjoining region.

From Taiyuan-fu to Kiang-chow a very frequented road, traversing numerous important cities, runs along its banks. It is navigable for no great distance, boats being able to go no further into the province than Kiang-chow.

The chief cities likely to be tapped by the railway, are, in the order of their location proceeding northwards from Tung-kwan, Kiang-chow, Ping Yang-fu,

Fenchow, Taiyuan-fu, Ning Wu-fu, Tatung-fu and Kwei Hwa-cheng.

Kiang-chow is within the bend of the Fen-ho, and is prettily situated. It is the terminus of navigation and the principal market place of south Shansi. It lies in a plain of considerable fertility and is in the neighborhood of coal mines.

Ping Yang-fu is one of the oldest cities of China, but of its ancient splendor the only remnant to-day is a magnificent city wall. It is situated in a vast alluvial plain where the system of irrigation is unrivalled. Tradition states that the Emperor Yao once resided there.

Fenchow-fu is an important town near a rich valley abounding in coal.

Taiyuan-fu is, of course, the capital of the province, and by virtue of this fact and its railway connection, is the most important city in the province. It is situated on an elevation of 2,600 feet on the north of a vast plain studded with populous villages and neatly constructed houses. Nearly all the valleys which open on to the plains have mines, carts drawn by oxen, wheelbarrows, and pack animals bringing the coal to the capital. Formerly this city manufactured defensive weapons on an extensive scale. Its commerce is very brisk. It is surrounded by beautiful gardens and orchards. In several places throughout the plain coal, iron, and sulphur are found. The city is electrically lighted, and its roadways are macadamised and well kept.

Tatung-fu has already been referred to in the article dealing with the Chang-sui Extension. It is destined to be an important trading centre, and the deposits of coal and sodium carbonate in the vicinity are sure to become of great value.

Kwei Hwa-cheng, or the Blue City, comprises two towns, the one religious and military, with its schools and its Lama monastery (the Grand Lama of Urga at one time resided here); the other largely commercial. The latter is an important market for skins and camel-hair ropes, etc., imported from Mongolia. The environs are covered with fruit trees.

The exports of Shansi are principally coal, iron, salt and products from Mongolia, while the imports consist of corn, silk, woollen goods, tea and salted provisions.

In both industry and commerce Shansi holds a prominent place, many cities and villages devoting themselves to industry. It is this fact combined with the undoubted richness of the province which tend to make the proposed railway one of considerable value as an earning factor.

CHINESE PAVILION AT BRUSSELS

The Consul-General for Belgium, Mr. D. Siffert, sends us the following:—

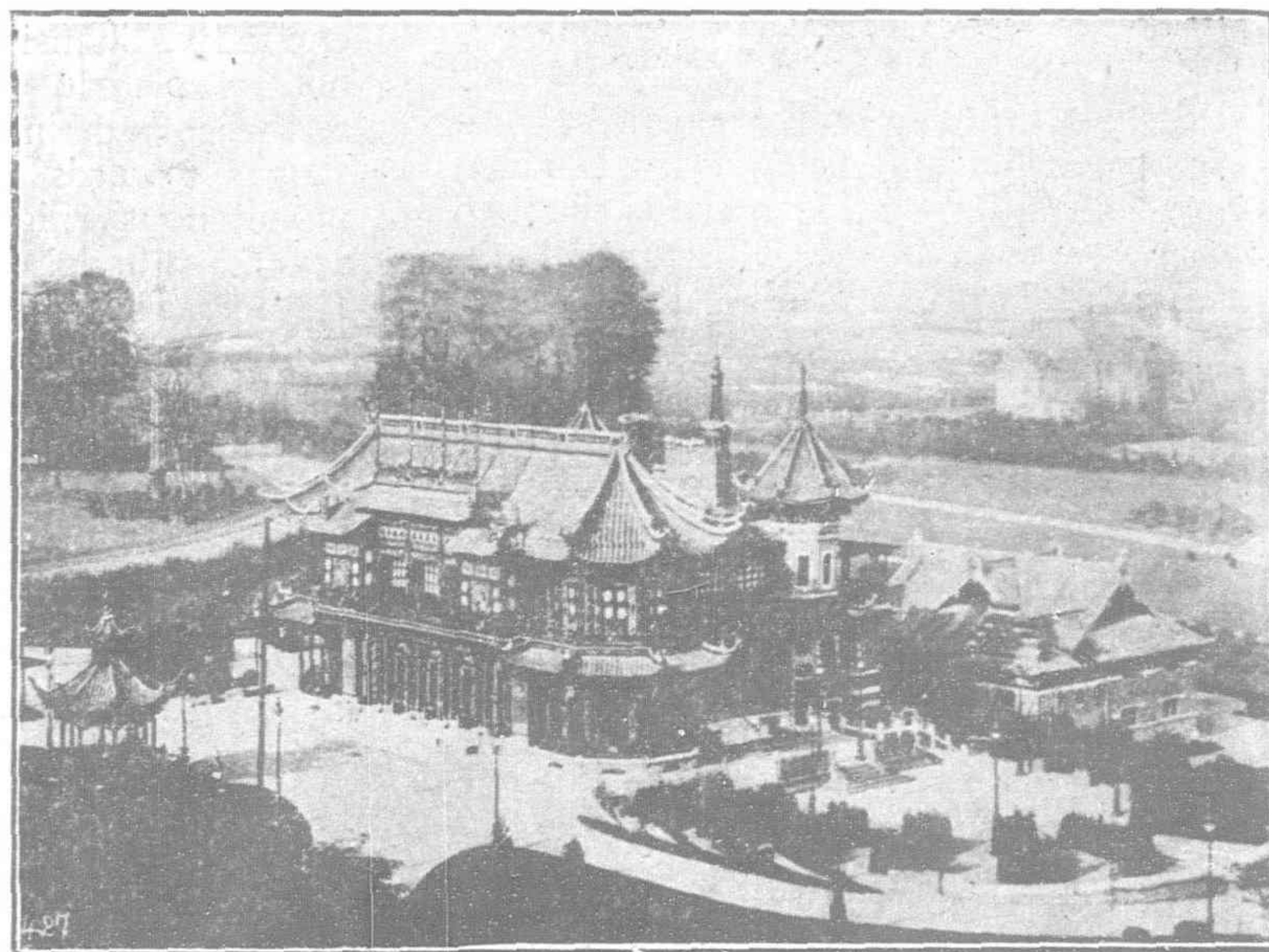
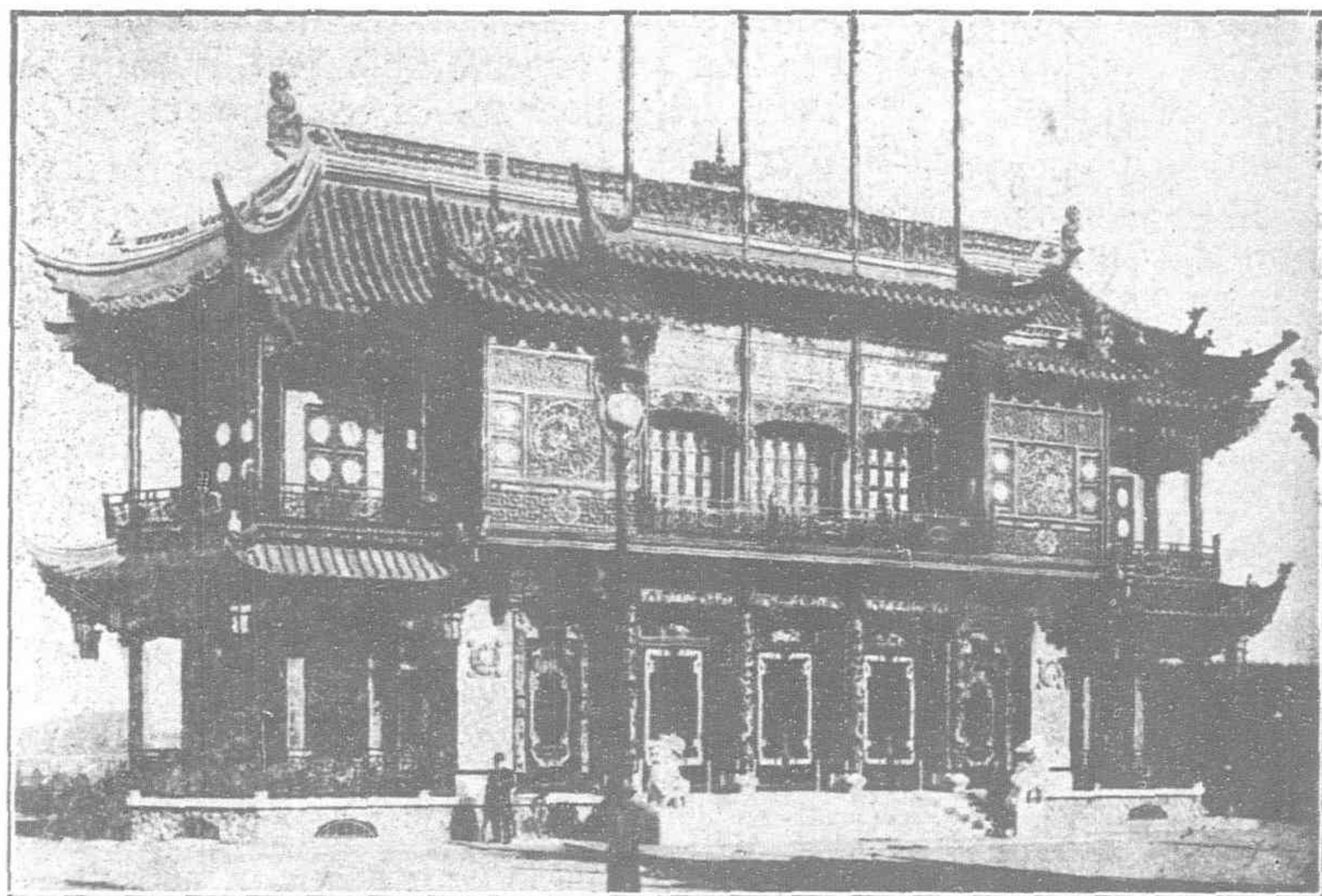
The Chinese Pavilion, situated near the Garden of His Majesty the King of the Belgians, Brussels, has just been annexed to the Official Bureau of Commercial Informations, and will be devoted to a permanent

1°. No fee shall be levelled for rent and supervision. Collections will be kept in the Chinese Pavilion, Government's Building, under the supervision of the Foreign Office staff and every care will be taken against theft or fire. However as no tax is collected, the Government shall not be held responsible for loss, wreck or theft of the objects; those risks being taken by the owners in consequence of the service rendered.

2°. Cases or Boxes containing Collections

staff of the building will give to those interested in Belgium the necessary information to persons desirous to get into touch with exhibitors for buying purposes, or with a view to represent them in Belgium.

5°. Forwarding charges c.i.f. Antwerp are to be paid by owners. The Government will, however, assume the cost of reception of articles which exhibitors should want to replace or take back. Said forwarding charges shall be paid by the Government for



exhibition of articles which may form the object of a traffic between Belgium and China.

The utility for Chinese Firms to exhibit their products in the Chinese Pavilion is evident, and hereunder are the conditions to which exhibitors should comply to benefit of His Majesty's Government offer.

must be provided with an address stamped with the seal of the Belgian Consulate according to a model at hand.

3°. No Customs duties shall have to be paid.

4°. Collections exhibited are not for sale.

All informations regarding origin, prices and freight, rates must be added, and the

exhibits presented to them by exhibitors and becoming thus their property.

The opening of the Exhibition taking place in the course of August, 1915, exhibitors are respectfully requested to communicate without delay with the Belgian Consulate-General in Shanghai for further information.

NEW SHANGHAI-DAIREN LINER

Passengers who prefer the overland route between the Far East and Europe, via Siberia, to the ocean route, via Suez, will be glad that, thanks to the well-known go-ahead spirit and enterprise of the South Manchuria Railway Company, they will now be able to travel between Shanghai and Dairen in a fine new steamer specially built for that Company's Shanghai-Dairen Direct Mail Steamer Service. The new steamer, named the Sakaki Maru, was built at Kobe by the Kawasaki Dockyard Company, and was launched on March 23rd of this year. She started her regular service on Thursday, August 14th and arrived at Shanghai on the 16th. By invitation a number of Shanghai residents inspected the fine new steamer. The Sakaki Maru will leave Shanghai every Monday and Dairen every Thursday, thus affording homeward passengers booked for the Wagon Lits the advantage of her accommodation. The new steamer is equipped with the wireless telegraph, and carries a doctor on board. She has a gross tonnage of 3,876 tons, is fitted with the Curtis Turbine Engine, and can develop a speed of over 19 knots per hour. She has accommodation for 63 first-class, 20 second-class, and 164 third-class passengers. The first-class accommodation comprises 15 ordinary cabins, containing 30 berths and 13 sofas; 3 family rooms, containing 12 berths and 3 sofas; and four special rooms containing 5 beds and one sofa. The second-class accommodation consists of four ordinary cabins, containing 16 berths and four sofas; and the third-class comprises 164 bunks. Her length is 366 feet; breadth 45 feet; and depth, 26 feet.

In connection with this development of the Shanghai-Dairen service, it is interesting to learn that the South Manchuria Railway Company will shortly attach Second-Class Sleeping Cars to all its Express Trains. Hitherto, travellers between the Far East and Europe by the Trans-Siberian route have had to travel first-class over the S. M. R. Co.'s section, and this new feature will render what is admitted to be one of the best railway services in the world even more popular.

Both steamer and train times of the South Manchuria Railway Company remain unaltered.

JAPAN COTTON TRADING CO., LTD.

The Japan Cotton Trading Co., Ltd., (Nippon Nenka Kabushiki Kaisha) has recently issued a little pamphlet in commemoration of the twentieth anniversary of its establishment.

The progress of the company has been rapid, for, from being solely a commission organization dealing in cotton and cotton yarn, it now engages in cotton ginning and spinning, the manufacture of oil and oil cake from cotton seed, and other important commercial operations.

The company has its head office in Osaka, branches in Shanghai, Hankow, and Bombay, agencies at New York, Fort Worth, Hongkong, Tientsin, Tsingtao, and Dalny, and the following factories:—Sesshin cotton spinning company at Shanghai, beancake factories at Hanyang and Hankow, cotton-seedcake factory at Hankow, and a cotton pressing factory at Hanyang.

At December 31st, 1912, the subscribed capital of the company was Y. 2,000,000, with reserve funds of Y. 900,000. The net profit for the last half-year amounted to Y. 322,492.

On account of the expansion of business in Shanghai, a new office site has been purchased at the corner of Hankow and Szechuen roads, for which the sum of Tls. 180,000 was paid.

At the general meeting of shareholders held on July 21st last at Osaka, Mr. Y. O. Baba, manager of the company's Shanghai branch, was elected a director to reside in Shanghai, retaining, at the same time, the management of the office as heretofore.

Mr. Atsushi Yamada, another director, is the first and only Japanese member to hold a seat on the New York Cotton Exchange.

ADVERTISEMENT CORRECTION

Certain corrections for the advertisement of Messrs. Arnhold, Karberg & Co., which appears on page 23, were received too late to be made in the advertisement itself. Among the agencies held by Messrs. Arnhold, Karberg & Co., the following changes are to be noted:—For Ammunition, etc., instead of Deutsche Waffen and Munitions Fabriken, Berlin, Karlsruhe, the firm represents Hirtenberger Petronen-Zundhutenend Metallwaren Fabrik Hirtenberg; for Army Rifles, Arms, etc., instead of Waffenfabrik Mauser A. G., Obendorf, Nickar, the firm represents Osterreichische Waffenfabrik Ges: Steyr, while the agency for the Falls Hollow Stay Bolt Company, Cuyahoga Falls, Ohio, for Boiler Stay Bolt Material has been relinquished.

THE FAR EASTERN REVIEW

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THE MONTH IN CHINA

Although there were indications at the end of July that the rebellion was likely to prove entirely unsuccessful, the rebels continued a stubborn resistance throughout August. Inevitably as a result the strife continued practically to monopolize attention and the revival of trade and commerce which was hoped for, if not anticipated, was again postponed to the indefinite future. Whatever happens in the next few weeks, the progress of China towards better economic conditions has been seriously retarded. Even before the rebellion broke out China was confronted by a serious financial position. The relief afforded by the Five Power Loan, it was realized, was temporary in character and the problem of securing even sufficient money for administrative purposes during the last quarter of the year was already demanding attention. It is hardly necessary to say that the problem has now become much more difficult of solution. Ever since the revolution in 1911 the taxation machinery has been idle or has been working irregularly—the Customs excepted.

Under the conditions which prevailed and have now been intensified, it was impossible to reorganize and systematize the scheme of provincial taxation. If the Central Government are to perform their functions at all satisfactorily, it is essential that they should have definite knowledge of what revenue they can expect to receive. Ever since the revolution, and especially at the present time, the Government are completely in the dark in regard to this and other material points. A readjustment of the political relations between the Central Government and the Provincial Governments is clearly necessary, and it is to be anticipated that one result of the rebellion will be a clearer delimitation of their respective powers. This will, however, take time and in the meantime temporary means will have to be adopted to pay the expenses of administration and provide for the service of foreign loans.

In the meantime the work of reorganization and development is held up. For China to attain a position of national solvency the old industrial machinery will largely have to be scrapped. The struggle for industrial supremacy is so strenuous at the present day that the adoption of the most modern methods and the latest appliances is essential to success. Unfortunately for China these requisites cost money. The position is an extremely difficult one. Unless China adopts modern methods and appliances she cannot secure the revenue upon which her national safety depends; unless she secures money she cannot adopt modern methods and appliances. It is obvious that the problem is one that calls for constructive statesmanship of a very high order. Upon its satisfactory solution may depend the continued existence of China as a separate national entity.

At the present time it is impossible definitely to state the effect that the rebellion has had upon the railways. A useful indication, however, is given by the figures relating to the Shanghai-Nanking Railway, which we publish elsewhere. In addition to the direct loss due to curtailed earnings account must be taken of the damage to the permanent way, buildings and bridges and rolling stock. Fortunately the Hwai River Bridge on the Tientsin-Pukow line escaped destruction, though it would appear that it was in imminent danger. The aggregate loss to the Peking-Hankow, Tientsin-Pukow and Shanghai-Nanking railways must total a very large figure. Another object lesson in the value of railways in time of war has, however, been given, and if the result be increased activity in railway construction a certain amount of good will have come out of an undoubted evil.

Numerous rumours of fresh loans for railway and other purposes were in circulation during the month. The agreement for the construction of the Canton-Chungking Railway signed by the Chinese National Railway Corporation and Messrs. Pauling & Co., Ltd., has not apparently been finally sanctioned. It is stated, however, that a contract for a loan of £10,000,000 has been signed between the Government and the Compagnie Générale de Chemins de Fer et de Tramways en Chine for the construction of a line from Kwei Hwa-cheng to Chengtu. Messrs. Carlowitz & Co. are said to have offered the Provincial Government of Yunnan £3,000,000 for the construction of a line from Yunnanfu to Poseh in return for certain concessions. A number of other offers of financial assistance, it is reported, have been made to the Central and Provincial Governments.

The Chinese Parliament, it is interesting to note, has continued its sittings during the month and has made steady progress. The Kuomintang, or Nationalist Party, has expelled from its ranks the prominent members who had openly joined the rebellion.

U. S. RAILWAY BUSINESS FOR MAY

During May the railways of the United States received for their services to the public an average of \$8,230,000 a day; it cost to run their trains and for other expenses of operation \$5,920,000 a day; their taxes were \$341,500 a day; their operating income \$1,972,322 a day for the 220,897 miles of line reporting, or at the rate of \$8.93 for each mile of line for each day. Thus for every six dollars of their earnings which remained available for rentals, interest on bonds, appropriations for betterments, improvements and new construction, and for dividends, the railways had to pay more than one dollar in taxes.

(Continued on page 93)

GROWTH OF BELGIAN INTERESTS IN CHINA

As is announced in another part of this issue China has signed an agreement for a loan with Belgian financiers to construct and equip a railway through Shansi province, with an extension southwards to Chengtu—the capital of Szechuan province.

The signature of this agreement brings forcibly to notice the most important development in international enterprise which has taken place in China in recent times. Belgian interests have sprung up in a night, as it were, with the rapidity of the famous beanstalk of fable. From a comparatively insignificant seed they have sprouted into luxurious vegetation which casts compassionate shadows upon the meagre crop produced by other less wide-awake foreign financial farmers who have been tilling the not too productive soil of China for many decades.

Whether this forced growth of an exotic is good for China is another question. The fact that has to be faced is that it is here, and thriving amazingly. Results count. The Belgians who have been working quietly and unostentatiously to produce the wherewithal for the beanfeast are to be congratulated; nor need too close an inquiry be instituted in regard to the method of fertilisation adopted to produce so fruitful a crop, whilst laborers in other directions have evoked nothing much more exhorting to the feelings than an ænemic looking sprout which has nothing to recommend it to consideration but the questionable verdancy of "promise."

The feeble little plant of the Quintuple Group, for instance, has been watered mainly with the saliferous lachrymation of disappointed hopes. The Group floated a Reorganisation Loan of £25,000,000—an unproductive piece of business—to aid China through her troubles, and China shows her gratitude for the assistance in that time of pressing need by granting financiers outside the sacred pale of the Quintuple consortium substantial railway loan agreements which make past performances of the kind look insignificant in comparison.

In the short time which has elapsed since the Revolution Belgian interests have been particularly favored. They have been granted the now notorious loan contracted for the Government by Mr. Tang Shao-yi, for £1,000,000; the loan for the construction of the Lung-Tsing-U-Hai railway for £10,000,000, and the loan just signed for the construction of the railway through Shansi province. The chief item of importance in the last two transactions is the fact that the Belgians have the monopoly to supply the whole equipment for some two thousand miles of railway.

The Governments behind the Quintuple Group have religiously prevented their nationals from participating in business which has undoubtedly been available, in order to keep China in the narrow path of financial rectitude, and that fact combined with the reluctance of the Chinese to be fettered too much at this period with exacting schemes for auditing, has made it possible for the Belgian operators to effect one of the largest coups that have been brought off by one combination in many years. A consideration which may have induced the Chinese Government to make these railway deals is a sense of gratitude to the Belgians for coming forward in March, 1912, with a welcome million sterling which aided them materially in defraying expenditure in certain directions which the then Sextuple Group would not have tolerated. A further inducement undoubtedly was the possibility of securing further sorely needed ready money in the shape of "advances" which could be used without the aggravating interference of auditors.

The representatives of the *Compagnie Générale de Chemins de fer et de Tramways en Chine* have been up and doing whilst the Quintuple Group and the representatives of the Governments supporting them have been resting in placid contentment on the salubrious Western Hills, near Peking, or have been gaily abandoning themselves to the buffeting of the breakers at Pehtaino, satisfied that they, and they alone could, when they felt so inclined, control such ventures as those which have now slipped past them into the hands of a syndicate hitherto held by them in something akin to contempt. If the Quintuple Group believed that they had the Chinese bound down to a certain procedure with regard to industrial enterprises it would appear, then, that the Chinese have once again exhibited their faculty for being able to drive horses and carts—or, in this case, railway lines—through any undertakings or understandings which they might make. The signing of the agreement for the Lung-Tsing-U-Hai railway was a severe shock to the bankers, but the latest evidence of their failure to control the Chinese Government in the manner in which they believed they would be able to do has come upon them like a bolt from the blue. It is unnecessary to remark that both these agreements were negotiated and signed up in absolute secrecy.

It is quite probable that the Quintuple Governments—or rather one or two of them who need not be specialised—will begin seriously to wonder if after all it was profitable for them so loyally to prevent their nationals doing business of

the character now prompting this reference in order to permit such to be controlled by the banking firms represented in the Group. America, of course, withdrew from the Group, and her nationals had a fair field if they had felt disposed to avail themselves of it, but American financiers have no wish to enter into business with China at this juncture, and therefore suffer nothing but the results of inaction of their own volition. But the British independent firms have found themselves seriously handicapped. They have been restrained from activities which might have been productive of excellent results, and even those who have entered into negotiations with China are threatened with lack of diplomatic support in any undertakings into which they may have ventured. It is only natural that independent firms view with anything but gratification the success of the Belgians, but the Belgians are not to be blamed for successfully hauling plums out of the pie in the pantry whilst others have been sucking their thumbs on the lawn. The Belgians are here for business, and they are entitled to what they can secure if the Chinese Government exhibits a disposition to deal lavishly with them.

How such contracts as those entered into with the Belgians will affect China politically in the future is another matter. Much depends upon the amount of Russian money and diplomatic influence involved in the *Compagnie Générale de Chemins de fer et de Tramways en Chine*—or, to put it in another way, how far the *Campagne* is involved in Russian diplomacy. Current report has it that the concern employs its energies in the interest of Russia, but current report is sometimes grievously in error. The allegation, too, is as stoutly denied by the Belgian partisans, while added refutation is supplied by the Russian Minister in Peking, who unequivocally asseverates that Russia has nothing whatever to do with the concern or its affairs.

That may or may not be true. The significant point is that the latest performances of this Company bring into effect the identical scheme which the Russians long ago cherished to obtain railway domination in certain spheres in China. Such a suggestive thing may be merely the long limb of coincidence, but it is worthy of attention.

Reference to old maps, or in fact the map published as late as 1911 under the title of "Stanford's Map of the Empires of China and Japan," will show what that scheme was. Red lines there indicate the Russian project to connect Russia through the centre of China with a warm seaport in the region of the mouth of the old Yellow River or the

Yangtsze River, as well as another line branching northwards from the vicinity of Tungkwan, in south-western Shansi, through Taiyuan-fu, Tatung-fu and Kwei Hwa-cheng, and on to Urga.

The two lines secured by the Belgian Company most peculiarly follow in detail these routes, so far as they concern China proper. From the west Russia designed to enter China by way of the Province of Sinkiang—or what used to be known as Chinese Turkestan—continuing the trans-Caspian system of Russia from its terminal at a place called Andijan, about one hundred miles from the Sinkiang frontier. From there it was planned to build a line south-eastwards to the frontier, and then due eastward to Kashgar, whence it would strike north-eastwards, along the old trading route, through Utch, Aksu, Mai, Sairam, Karashar and Hami. It would then turn south-eastwards across the boundary of Kansu Province, through Suchow (to which place the Belgians now have the option to extend the midland trunk system), to Lanchow-fu, on to Sian-fu, to Honan, Kaifeng, and to the sea. As far as Suchow, in Kansu, from the sea this line is now in the control of the Belgian syndicate.

The other Russian project, which linked up with this proposition, was the line already mentioned from Tungkwan longitudinally through Shansi, to the Mongolian frontier, and thence on to Urga. This is the route which has now been obtained by the Belgians as far as Tatung-fu.

Russia, in the latter years of the Manchu régime, used every possible influence to secure the rights for these lines, but the Manchus—corrupt, short-sighted and disregardful of the welfare of China as they might have been, and as they were alleged to have been—never once lost sight of the dangers that lurked in such a proposition, and they successfully resisted every move made and every blandishment offered to seduce them to forget what they believed to be the best interests of their country. They declined to employ European money in this direction at any cost.

So scrupulous were they, indeed, to avoid complications which might give the claws of the Bear even an indirect hold upon the carcase of their country that they would never, under any circumstances, hypothecate the Peking-Kalgan lines as security for any loan floated by European financiers. Not even the terrible temptation caused by the dire lack of funds which threatened their tottering throne during the Revolution caused them to weaken in this resolve. They could have had money on the security of the Peking-Kalgan Railway which might well have turned the scale in their favor, but they forewent it—and they fell. Yet what did we see? We saw the Premier of this Young Republic, —which, it was claimed, would tread under foot the corruption and the neglect of country which characterized the Man-

chus,—pledge that line as security for a million sterling from the Belgians almost within one month of the abdication of the alleged “rapacious enemies of China.”

Thus the Republicans broke down without a moment's hesitation what was a tradition with the Manchus. Nor was that enough. Within one and a half years of the abdication of the Manchus, the Government has given to European financiers who are alleged, rightly or wrongly, to be influenced by Russian interests, the very railways which Russia strove vainly to obtain from the Manchus. A statement also gained considerable currency in Peking to the effect that the Government had ceded the right of constructing the Tatung-Kwei Hwa-cheng section of the Changsui Extension of the Kalgan line to the Belgians, but that is denied both by the Belgian representatives and the representatives of the Chinese Government. It is difficult to believe that the Government would be so short-sighted as to hand over to continental financiers this vital section of a line which must be portion of any railway destined to connect Urga with Peking, and we are at present prepared to accept their denial of the story, *malgré* the vociferations of its circulators as to its accuracy. It is to be hoped in the best interests of China that the Kalgan-Kwei Hwa-cheng railway will always be retained in the control of the Government. It would be folly, to use the mildest phrase, for them to permit any European financiers to build it.

That fears are expressed by well-wishers of China that Russian capital and diplomacy are connected with the Compagnie Générale de Chemins de Fer et de Tramways en Chine is not surprising in view of the early association of Belgian and Russian interests in China. When the Belgians first came into the field as factors to be reckoned with—that was in 1897 when they secured a contract for a loan of 112,500,000 francs for the construction of the Peking-Hankow railway (760 miles)—they were then described as “a Franco-Belgian combination with Russian proclivities.” The financial arrangements during the currency of that loan were by clause eighteen of the contract, placed in charge of the Russo-Asiatic Bank, and the negotiations were strongly supported by the Russian, as well as the French, Government.

Russian interests were not so prominent in the next venture—the contract for the Kaifeng-Honan railway (140 miles) which was signed in November of 1903. The syndicate was then composed of:

La Compagnie Générale de Railways a voie étroite; la Société Générale de Chemins de Fer Economiques; la Compagnie Belge des Chemins de Fer Reunis; la Société Russo-Francaise de Chemins de Fer et de Tramways; les Banques Empain de Bauer, Anspach, Dausette et Roy de Blicquy; la Banque Russo-Chinese, la Banque Benard et Jarislowsky, etc.

This organisation was known as the

Compagnie Générale de Chemins de Fer et de Tramways en Chine, and by virtue of the clause in their contract giving the option of extending the line from Honan-fu to Sian-fu, the recent contract was given to build the Lung-Tsing-U-Hai railway. It is claimed, however, that the organisation underwent a change which eliminated Russian interests, but that remains to be seen. At all events it is certain that French interests exist, and it is more than likely that they will participate in the loan now being arranged for the Shansi project to a large extent. The one thing that is certain is that the loan will not be purely Belgian, and the interesting point to China is: How far does Russia financially or politically participate?

U. S. RAILWAY BUSINESS FOR MAY

(Continued from page 91)

All of these amounts are substantially greater than the similar return for May, 1912. They are from the summary of the earnings and expenses compiled by the Bureau of Railway Economics from the monthly reports of the steam railways of the United States to the Interstate Commerce Commission. They include over 95 per cent. of the mileage and earnings of all of the railways of the country.

ELECTRICAL ENTERPRISE IN KOREA

The total amount of capital invested in electrical concerns in Korea is about £1,225,000, says the *Financier*. Of this sum £980,000 is invested in concerns already working, and the balance in electrical works which are in course of construction.

During the year two new companies, the Gensan Hydro-electric Company and the Taikyu Electric Company, commenced operations. The former supplies the town of Gensan with light and power, and is the only hydro-electric company in the country. The latter supplies light and power to the town of Taikyu.

Eight other companies, which have already received official sanction, are expected to commence work during the present year.

For the moment there would seem to be a general tendency to await the results of the undertakings now in hand before embarking upon new enterprises. Though British electrical machinery is perhaps not so largely represented in Korea as could be wished, nevertheless a considerable portion, especially prime movers and boilers, are of British manufacture. British machinery is popular, as it is known to be of good quality, but reasons of economy lead purchasers to seek cheaper markets elsewhere.

It is reported that, with regard to the opening of Pukow, the Director, Mr. Chian, has submitted an estimate of about \$10,000,000, which amount, however, does not include the expense for the purchase of lands. The Ministry of Finance cannot raise such a large amount and proposes that a public loan of \$20,000,000 should be raised for the opening of this new treaty port.

TIENTSIN-PUKOW LINE, NORTHERN SECTION

ANNUAL REPORT AND ACCOUNTS

General Report

Mr. Hsiau, the Managing Director of the Tientsin-Pukow Line, Northern Section, has issued his report for 1912. He says:—

I herewith submit the report upon the construction and traffic of the Railway during 1912, with the following remarks:

1. *Construction.*—The progress of the construction during 1912 is dealt with in the attached report of the Engineer-in-Chief.

The Board of Posts and Communications in Peking decided to adopt the thirty-first day of March, 1913, as the date of the termination in the construction in terms of the Tientsin-Pukow Loan Agreement.

2. *Loan Service.*—During the year under review, it was found impossible to place, at anything like acceptable terms, the second issue of the Supplementary Tientsin-Pukow Loan of 1910, nominally amounting to £1,410,000. This retardation arose out of the political situation in China as well as in Europe and out of the resulting disinclination of the money market to take up any loans. We were therefore compelled to accept the assistance of the Deutsch-Asiatische Bank, who placed at our disposal various sums on the guarantee of the unissued part of the loan, which sums amounted to a total of £662,000 at the end of 1912. During the period September to and including December, 1912, we were in a position, however, to set aside from our traffic revenue sufficient funds to cover our construction and running expenses in China, the part-payments due to the Maschinenfabrik Augsburg-Nürnberg for bridge work and the purchase of material and stores in Europe.

3. *Statement of Accounts.*—With regard to the appended statement of accounts, the Auditor of the Syndicate has taken occasion to make the following two observations:

A. *Final Head Title I:* the amounts paid for landpurchase by the Land Office and the Land Office Tsinanfu have not been verified so far by the Engineer-in-Chief.

B. *Store Account Tsinanfu:* the amount placed at the debit of this account does not give the final statement end of December, the final accounts having been retarded by stress of work, a final stock taking has been made middle of April (i.e. 1913).

In explanation of these observations, I have to say the following:

a. Purchase of Land.

The purchase of all the ground required was effected by a special Land Purchase Office. This office acquired all the land strictly in accordance with the plans submitted for this purpose by the European divisional engineers. During construction time, this office was working under continuous high pressure and was, in consequence, unable, as will easily be understood, to complete a final detailed survey of all the ground purchased as well as its demarkation by boundary stones. This work was commenced in conjunction with the European engineers at the end of the year, however, and will produce in due time final records of all the purchases of land signed by the engineer and verified by the Engineer-in-Chief.

b. Store Account Tsinanfu.

Towards the end of the construction period in November-December, 1912, all divisions and sections were instructed to return to the Head Store all the material, etc., still in their possession, such as permanent road material, tools, construction plant, etc. It need scarcely be said that with such a vast undertaking as the construction of the Tientsin-Pukow Railway undoubtedly is, these instructions brought forth a very considerable quantity of material, etc., which on being returned to the Head Store, had to be

sorted, stored away and revalued as it had more or less suffered from wear and tear. Owing to this increase of work, the staff was unable to finish the inventory of the whole of the stocks by December 31st, 1912. This has been completed in the meantime, however, and the inventory will be embodied in full detail in the final report on the construction period separately showing new and used stocks.

4. *Traffic.*—A statement of the monthly traffic returns is appended. Detailed statistical records of the various sources of our traffic revenue were not kept in 1912, as during this period the railway was still in the construction stage.

a. Passengers.

Passenger traffic shows a satisfactory upward tendency in all classes. After the junction of the Northern and Southern Section was effected in the last month of the year 1912 by the completion of the Hwangho Bridge, an increase of traffic was noticed, for part of which the additional express train with sleeping accommodation is responsible, which was now started running twice a week both ways between Tientsin and Pukow (Nanking), covering the distance in twenty-six hours, thus offering the quickest mode of travelling between the north with its approaches from Europe via Siberia and the Eastern part of the Yangtze valley with its approaches to America and Australia via Japan and the Philippines. But also the other trains showed increasing revenue from passenger traffic.

On May 1st, 1913, daily through passenger trains over the whole line will be introduced, which we confidently expect to give a further impetus to the satisfactory development of our passenger traffic during the first year of traffic operations unimpeded by construction.

b. Goods.

The increase of traffic under this head is still more pronounced. Especially in the South of Shantung, the demand on the traffic facilities of the railway for the transportation of farming products, coal, etc., during the autumn season was such as fully to engage the whole of our rolling stock.

The interchange with the Shantung Railway in Tsinanfu has developed in a satisfactory manner.

5. *Staff.* In the latter half of the year 1912, the gradual completion of the work compelled us to dispense with the services of a part of our Chinese and European staff, in the case of the latter on expiry of their respective contracts. We take this opportunity of once more expressing our thanks for their devoted co-operation to these as well as to the present members of our staff.

Report of the Engineer-in-Chief.

Mr. J. Dorpmüller, Engineer-in-Chief, reported as follows:—

In the course of the year 1912, the following work was carried out:

A. *North of the Hwangho.*—The ballasting of the line was completed. The brick kilns were shut down with the exception of three kilns near Tientsin which were kept working for supplying the requirements partly of the railway and partly of private consumers of bricks, tiles, etc.

Of actual construction work, the protection of all bridges and culverts was perfected in 1912. In consequence of the experience had in August, 1911, on the occasion of the Yunho breaching its banks, the wings of the abutments of bridges and culverts were extended along the embankments, the bottoms of culverts strengthened with concrete re-inforced by wire netting or with a thick floor of masonry laid

in cement, their in and outlets safeguarded against the scouring and undermining action of the water by means of far extending additions to the masonry foundations of the bottoms, and these foundations themselves secured by means of especially deep reaching inverted external vaults.

With the exception of the erection of quarters for the police and the extension of the shunting and loading sidings of a number of stations, actual construction work was confined to the vicinity of Tientsin. A goods-yard with shed was added to the Tientsin West Station and an approach road of one kilometer length newly laid out. The erection of the station building at Tientsin West was left over for 1913.

At the Tientsin workshops, the outer wall and quarters for a European foreman and for the workmen were put up and the loco shed enlarged by two stalls.

All construction sections north of the Hwangho were abolished.

A start was also made with pulling down the jetties and the temporary stations at Peh-hwangho and Chiaoshan on the North bank of the Hwangho which had become disused on the completion of the Hwangho Bridge.

B. *The Hwangho Bridge.*—During 1912, the three main river spans were erected, the foot paths put in and the track laid on the bridge.

On November 16th, the last rivet was driven and on November 30th, the bridge submitted to the loading tests, immediately after which the first passenger train just arriving from Tientsin was taken across the bridge.

C. *The Working in and near Tsinanfu.*—The earth work for the interchange station between our station and the Tsinanfu West station of the Shantung Railway was completed, the metals laid and a station building put up. For the loco station Tsinanfu, a loco shed with ten bays was erected, a water tower with pumping plant, a coaling platform and quarters for the loco staff, followed in turn by the construction of the overhead bridge at the extremities of the station, guards' and pointsmen's cabins, the goods-shed, the police quarters and of the station building proper of our Tsinanfu main station, which will be completed by about middle of 1913. All sidings of this station as well as its connections with the main workshops, the Shantung Railway and two private sidings were finished.

On the premises of the main workshops at Tahuishu, the year 1912 saw the completion of the building of the main shed and the erection of the plant in all other shops except the machine and the locomotive repair shop. Operations were started in the Blacksmith's shop and in the foundry.

Of the power house, the masonry work was finished and the machine plant was nearly installed. Police quarters had been put up on the premises of the main workshops and a road laid out connecting the same with Tsinanfu.

A siding running down to the port of Lokou was laid on the dyke of the Hwangho.

D. *South of Tsinanfu.*—As far as the line had been under traffic for some length of time already, i.e. down to about Yenchowfu, further work was confined to protectionary measures and to ballasting, great value being attached chiefly to the safeguarding of bridges and culverts. On account of the insecurity of the country, considerable sums had to be spent on quarters for the police and their officers. South of Yenchowfu the line was at the beginning of 1912 in quite a provisional state; only the track itself was laid right through. At about thirty points, where the bridges were not completed yet, the track was carried across rivers on emergency bridges or through dry river beds by means of deviations. As the latter had to be removed by the beginning of the rainy season, keen

activity set in on this section of the line with the result that all deviations were actually displaced by the middle of June. Simultaneously, the earth work for the extension of some of the more important stations, particularly of Yenchowfu and Lincheng, was taken in hand as well as the ballasting of the line, for which purpose in part coarse sand was available. Eleven station buildings, fifty guards' and pointsmen's cabins, three water stations at Yenchowfu, Chieho and Lincheng with the requisite pumping plant, pipe lines, stand pipes and water towers were erected, besides a loco shed of six stalls each at Yenchowfu and Lincheng with the necessary turn tables, coaling platforms, workshops and workmen's quarters, and further quarters for the traffic and maintenance staff at Yenchowfu and Tchengsien.

With the completion of these works, the buildings on the main line were practically finished.

On January 15th, 1912, construction sections VII and VI were joined and on July 1st, 1912, construction sections VIII and IX.

E. The Branch Lines.—1. *Lincheng-Tsau-chwang.*—The embankment including the bridges having been completed in 1911, the metals were laid in 1912, beginning from Lincheng. Traffic was opened on May 25th. The earth work for the stations at Chow Wu, Tsitsun and Tsau-chwang was finished and the sidings laid. As on the main line, protectionary measures for safeguarding the bank and buildings were perfected. The work in connection with this branch line was finished with the completion of eleven guards, cabins, three station buildings with attached police quarters and a small loco establishment with water station. The ballasting of this line was proceeded with.

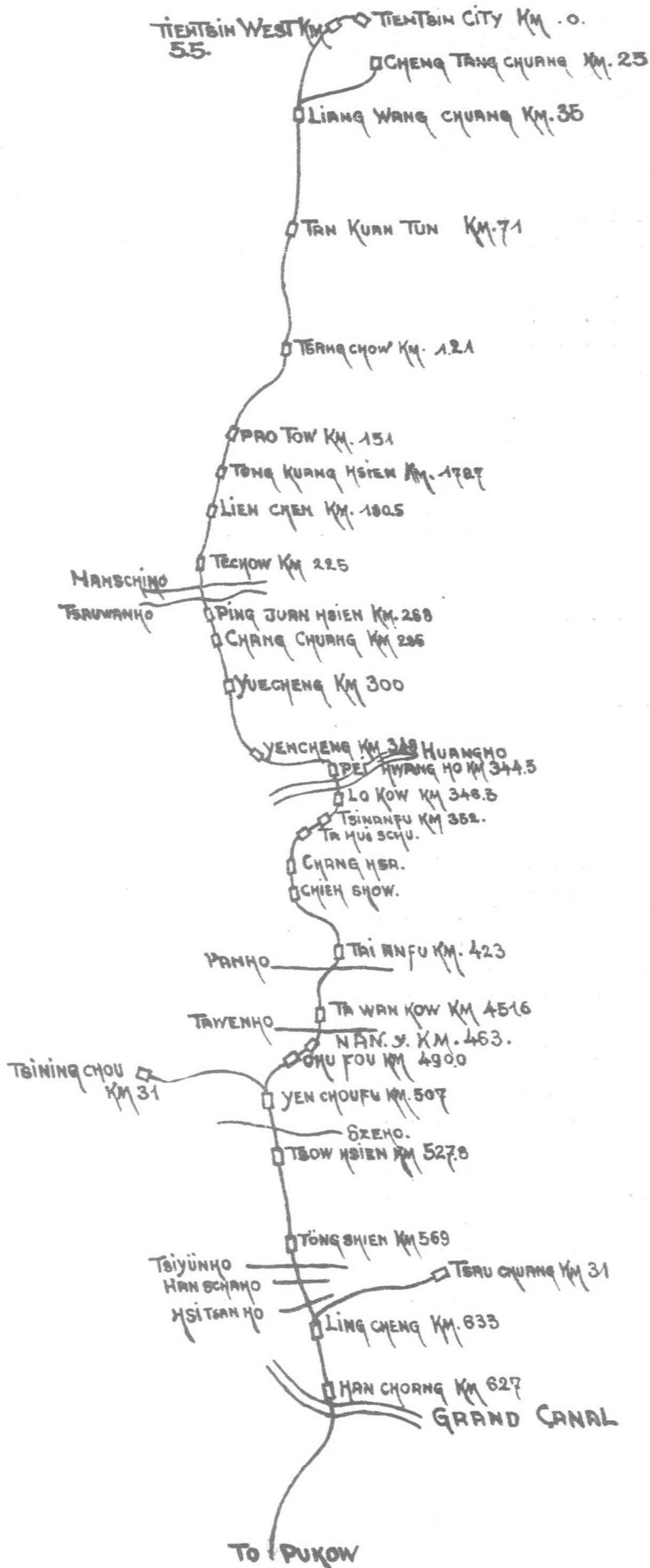
2. *Yenchowfu-Tsiningchow.*—In the spring of 1912, the pegging out of the approximately thirty-two kilometers of this line was completed, followed immediately by the purchase of the land and the commencement of the earth work.

Owing to a comparatively dry summer, a speedy supply of construction material was rendered possible over the country roads, a task which would have presented great difficulties under less favourable conditions. We were thus enabled to complete the earth work as well as the bridges and culverts by the end of August and to commence in the beginning of September with the laying of the metals, through traffic over this branch being opened on November 10th. As the banks have not had any rain to stand and are, in consequence, not settled yet, it is to be expected with certainty that they will give us some trouble during the next rainy season. In consideration of the inevitable loss of ballast during the settling process of the banks, the road has been temporarily ballasted with sand. Twelve guards' cabins, three pointsmen's houses and provisional station buildings at Sunszetien and Tsining were erected, and for the shed and the turn table of a small loco establishment in Tsining the foundations were just completed within the year under review.

(Continued on the next page)

AN American estimate of crude oil used by the railways of the United States for fuel in 1912 is 32,000,000 barrels. That was an increase of over 4,000,000 barrels 1911. Since 1906 there has been a gradual increase in oil consumption by railways, with the exception of 1908, when it fell about 2,000 barrels compared with the previous year.

ACCORDING to the *Abrasive Age* there is on board the battleship Pennsylvania a neat device for peeling potatoes. It consists of a large sheet iron cylinder provided with a revolving disc as a bottom. The entire inner surface of the peeler is impregnated with carborundum grain. By rotating the bottom, the potatoes are whirled about against the sharp carborundum grains, while a stream of water flows down upon them and flushes off the parings. It requires less than a minute to remove the skins from the potatoes.



TIENTSIN-PUKOW LINE
NORTHERN SECTION

SCALE: 1:2,500,000

Balance-Sheet. December 1912.

CAPITAL AUTHORISED AND RAISED BY DEBENTURE STOCK.

Details	Nominal value of bonds £	Rate of issue	Amount of discount £	Actual amount realised £	Actual amount realised Kooping Tls.	Remarks
Under Loan-Agreement 1908 £3,150,000.						
First issue	1,800,000.—	93	132,300.—	1,757,700.—	13,667,058.943	Interest is payable at the rate of 5% per annum on the nominal value of the bonds.
Second issue	1,260,000.—	94½	69,300.—	1,190,700.—	9,350,282.166	
Under Supplementary Loan Agreement 1910.						
First issue	1,800,000.—	93	94,500.—	1,795,500.—	13,157,862.641	
Second issue	(1,410,000.—) (not issued)	—	—	—	—	
	5,040,000.—		295,100.—	4,743,900.—	36,175,203.750	

TEMPORARY LOANS ON ACCOUNT OF UNISSUED PART OF SUPPLEMENTARY LOAN.

Details	Amount in £	Amount in Kooping Tals	Remarks
Tientsin-Pukow Railway Southern Section through Hongkong-Shanghai Bank.	250,000.—	1,832,061.075	Interest 4% per annum to be paid to Southern Section.
Deutsch-Asiatische Bank, Berlin	662,272.24	4,853,291.858	Interest 7% per annum.
	912,272.24	6,685,352.933	

CAPITAL BALANCE SHEET OF DECEMBER 1912.

Heads of Accounts	Debit Tls. cts.	Credit Tls. cts.
Capital	£4,743,900.—.—	36,175,203.750
Temporary Loans	£ 912,272.24	6,685,352.933
Deutsch Asiatische Bank, Tientsin	63,005.111	
" " " Berlin	2,080.395	
Capital Cash Account	(1) 83,728.809	
Interest on loan	6,495,686.103	
Interest received on bank deposits		1,114,005.449
Commission on Purchases	766,348.667	
Remuneration to the Syndicate and loan-service-expenses	(2) 1,005,174.682	
Exchange		63,230.165
Traffic Earnings less traffic-expenditure		2,048,959.574
Directorate General, Peking	416,302.275	
Various Debtors	41,124.154	
Various Creditors		734,805.407
Foreign Railways		29,405.031
Final Heads as per Schedule A.	37,038,427.851	
Suspense Account as per Schedule B.	939,084.262	
	46,850,962.309	46,850,962.309

1. Cash on hand and at Chinese Banks
2. According to articles 20 and 7 Tientsin Pukow Railway Loan Agreement.

SCHEDULE A. CAPITAL FINAL HEADS.

Heads of Account	Expenditure during the year 1912 Tls. cts.	Expenditure from the Commencement of operations Tls. cts.
*I. Landpurchase	1,616,875.151	1,813,795.508
II. Earthwork, etc.	273,936.319	1,713,359.227
III. Enclosures, excl. of the stations	2,067.960	3,691.796
IV. Level crossings	44,000.127	62,655.747
V. Bridges and passages	1,970,311.977	7,759,863.652
Va. Hoangho-bridge	1,439,922.639	4,545,611.418

VI. Tunnels	—	—
VII. Superstructure on the mainline on the stations	3,406,407.795	9,311,924.758
VIII. Signals and telegraphic signs	163,660.879	576,282.889
IX. Stations and Buildings	644,765.274	2,286,959.540
X. Workshops and Stores	257,058.221	710,764.061
XI. Extraordinary Works	25,152.708	166,793.362
XII. Rolling Stock	369,629.179	4,021,162.524
XIII. General Charges	520,078.878	3,411,413.472
XIV. Extraordinary	65,342.801	327,049.101
XV. Railway Police	164,386.292	327,100.796
Total	10,963,596.200	37,038,427.851

* Heading I.

The amounts paid for landpurchase by the Land Office and the Land Office Tsinanfu have not been verified so far by the Engineer-in-Chief.

SCHEDULE B. SUSPENSE ACCOUNTS.

Head of Accounts	Debit Tals cts.
Materials afloat	4,559.958
Head Store	70,946.650
* Store Tsinanfu.	754,889.935
Stores Divisional.	46,547.216
Telegraph Store	30,067.063
Fuel and Oil Account	9,859.585
Printing and Stationery	9,064.096
Miscellaneous Advances	10,665.709
Traffic Receipts	2,484.050
	939,084.262

* Store Tsinanfu.

The amount placed at the debit of this account does not give the final statement end of December, the final accounts having been retarded by stress of work, a final stock taking has been made middle of April.

TRAFFIC-EARNINGS OF THE YEAR 1912.

1912	Passengers \$ cts.	Goods \$ cts.	Total \$ cts.
January	—	—	192,141.28
February	—	—	140,593.90
March	—	—	184,290.96
April	157,671.25	62,016.11	219,687.36
May	152,642.38	54,005.55	206,647.93
June	116,993.77	40,955.05	157,948.82
July	123,870.40	52,876.64	176,747.04
August	137,990.80	78,236.26	216,227.06
September	148,796.58	128,173.16	276,969.74
October	171,089.05	167,788.26	338,877.31
November	179,885.82	151,010.72	330,896.54
December	197,438.73	190,993.60	388,432.33
			\$ 2,829,460.27

THE TWO NEW PACIFIC EMPRESSES

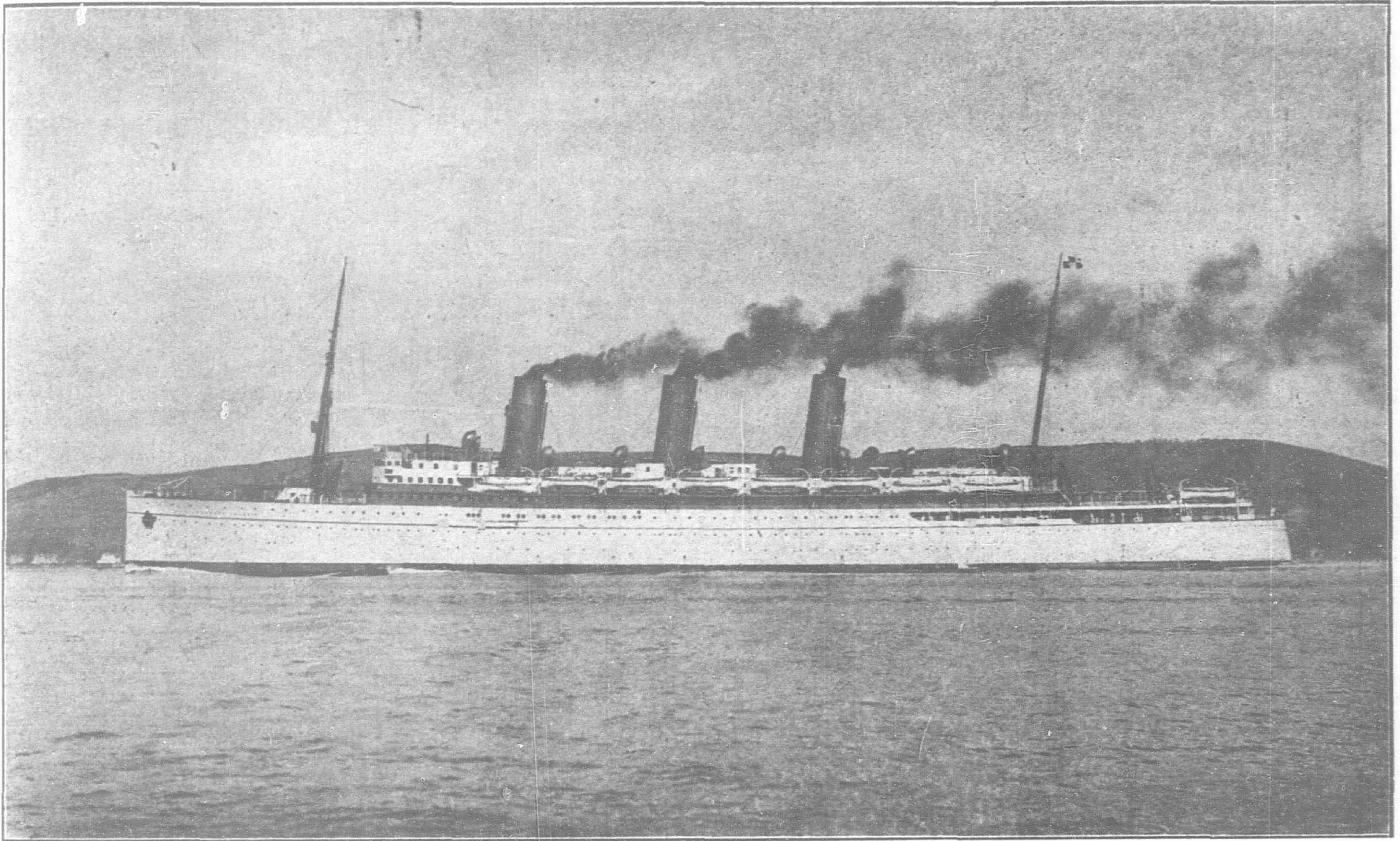
The Empress of Russia has already taken up her duties on the run between Hongkong and Vancouver, and has reduced the duration of the ocean voyage from Yokohama to Canada to 9½ days. She will shortly be joined in the service by the Empress of Asia, now on her way out via the Cape of Good Hope. The two sister ships are each of about 590 feet in length, 68 feet in breadth, and 46 feet in depth, and of 16,850 tons gross, with a service speed of 18 knots, and are the largest on the Pacific route. They are propelled by four screws driven by four sets of Parsons turbines. Steam is provided by an installation of ten boilers, working under Howden's system of forced draught at a steam pressure of 190 lbs. per square inch. A departure from current

be opened to the sea and the vessel will remain afloat. It may be mentioned that hitherto the Board of Trade standard has been that a vessel should remain afloat after the flooding of any two compartments.

INTERNAL ARRANGEMENTS

We extract a few items of interest from the full description of the vessels. The ships have each accommodation for 200 first-class, 100 second-class Asiatic and for 800 third-class Asiatic passengers, and will have a total complement of 475 officers and crew. The hold, orlop and lower decks beyond the machinery spaces are arranged to carry general cargo. On the shelter deck just forward of midships is situated the first class reception room and café, measuring 44 feet by 64 feet, with large embarking gangways on either side of the ship. Adjoining the café on the aft side is the main saloon 74 feet long and 64

central range, silver grills, steam stockpots, bain maries, hot closets, electrically driven roasters, potato peeling machines, and every conceivable labour-saving device. The bakery is fitted with water-tube ovens of the latest type, and the bakers' shop contains dough-mixing, ice cream machines and refrigerators. The hospitals, laundry, etc., are at the extreme end of the ship on the shelter deck. Ascending the grand staircase from the reception room the first-class state rooms on the bridge deck are reached. These rooms are enclosed in a complete steel deckhouse 340 feet long. Each measures 10 feet by 9 feet, with sleeping berths for two persons, and a couch convertible into a third bed in case of necessity. The sleeping berths are so designed that should the cabin be occupied by only one passenger, all evidence of the other berth is hidden, leaving only a single brass bedstead. Another feature is that two staterooms can be converted into



The above is a picture of the C. P. Ry. Company's new steamer, Empress of Russia, which with her sister ship, the Empress of Asia, has recently been completed by the Fairfield Company. The cruiser stern, besides giving the vessels a very distinctive appearance, adds considerably to the deck area at the after end of the vessels.

practice was made in deciding to construct the vessels with cruiser sterns and rudders entirely underhung. This form of stern besides giving the vessels a very distinctive appearance, increases the effective length of the waterline, and so assists propulsion besides adding considerably to the available deck space at the after end. The vessels have double bottom, orlop, lower, main, upper and shelter decks. Above the latter there is a long combined forecastle and bridge, the bridge deck being extended to the stern on side stanchions. Above the bridge deck there is a promenade deck about 350 feet long, on which are the principal first class public rooms, over this again are the officers's quarters and navigating bridge.

In order to ensure the safety of the vessels, the hulls are subdivided by numerous watertight bulkheads, closely spaced, one effect of which will be that any four compartments can

feet wide, lit from above by a large well 26 feet by 16 feet, and from the sides by a number of beautifully designed windows nearly 5 feet wide. The tables are arranged to suit the demands of various passengers, from small tables for two and four persons to semi-private tables for six arranged in alcoves, and larger tables for larger parties. In the central part of this deck is fitted the main kitchen, the pantries, cold larders, bakery, etc., equipped with all the latest hygienic and labour-saving devices necessary for serving the first and second-class passengers. To minimize the running to and fro a number of electric lifts have been fitted between the main kitchens and the various stores and deck-pantries on the bridge and promenade decks above. Indeed the culinary department has received the most careful consideration and everything possible has been done to make it efficient. The first and second-class kitchen is fitted with a large

one suite, with dressing room with hot and cold water adjoining. Surrounding the deckhouse is one of the first-class promenades, on either side of the house on the straight; this promenade is no less than 430 feet long, with a minimum width of 8 feet, while at the end it extends for 100 feet from side to side of the ship.

At the head of the grand staircase is situated the promenade deck, with a deckhouse 320 feet long by 44 feet broad, in which are first-class staterooms for one or two persons, handsome parlour suites of two, three and four rooms, all self-contained with bath room, dressing room, etc. Further aft a writing room has been introduced, and at the end are a smoking room and verandah café occupying a space 57 feet long, 43 feet broad and 14 feet high. Around the deckhouse is an open promenade with screen protection at the forward end, similar to that on the bridge

deck, while on the house top is a large gymnasium, fitted up with a large variety of exercising machines.

The outstanding feature of the vessels is the size, design and quality of the public rooms, parlour suites, special and ordinary staterooms, also the large proportions of the second-class and Asiatic accommodation. The public rooms in the Empress of Russia are fitted up in the style of the Louis XV and Louis XVI periods, while in the Empress of Asia these rooms are decorated in English style, that of the Georgian period. Space forbids a description of the arrangements for heating and cooling all the apartments of the ship, for lighting, ventilating, etc. The equipment includes, of course, the long range Marconi system.

THE MACHINERY

The propelling machinery consists of four turbines of the Parsons type, embodying the most recent improvements in design and construction to ensure the maximum economy of fuel consumption on service being attained. The port wing shaft will be driven by a h.p. turbine which will exhaust into a l.p. turbine driving the starboard wing shaft. The two inner shafts are each driven by a l.p. turbine which has a powerful astern turbine incorporated in the same casing.

The introduction of an i.p. turbine to the installation will provide a much wider range for the expansion of the steam, and will effect a marked improvement in steam consumption as compared with the usual arrangement of turbines, driving either three or four shafts, hitherto adopted in large mail steamers and naval vessels. Hitherto these have been fitted with either one h.p. turbine exhausting to two l.p. turbines, or two h.p. turbines exhausting to two l.p. turbines. For manoeuvring when entering or leaving harbours, independent high pressure steam connections are provided on each l.p. ahead turbine. An independent high pressure steam connection has also been provided on the l.p. turbine, which, combined with a suitable arrangement of valves, enables the h.p. turbine to be cut out, or should the i.p. turbine be out of action, the h.p. turbine can exhaust direct into one or other or both of the l.p. turbines. The four turbines are situated in one watertight compartment and in a separate compartment immediately aft the two condensers are placed, together with the circulating pumps, dual type wet and dry air-pumps, evaporators and distillers. The circulating pumps and air-pumps form two distinct and separate sets, each set working in conjunction with one condenser, and independent of the other, but are also arranged with suitable cross connections so that either set of pumps can, in case of emergency, work in conjunction with both condensers. The installation of auxiliary machinery is exceptionally large and, as in the case of the turbine installation, has been designed with a view to securing the greatest economy in fuel consumption and convenience in working. The feed water system for the boilers comprises two twin filters of the gravitation type, through which the water from the air-pumps is discharged on its way to the hotwell tanks; two hotwell pumps which discharge the feed water, first through a surface feed water heater and afterwards through a contact feed heater, from which the four feed pumps take their supply and discharge direct to the boilers. The feed water is heated by the exhaust steam from the auxiliary machinery throughout the ship, the steam from ship's heating systems and drainage systems from steam pipes, &c. The system evolved is the result of careful consideration, and will ensure that all waste heat from the auxiliary steam and exhaust systems are utilised in heating the feed water instead of the heat being carried away by the circulating water from the condensers.

For harbour use a separate auxiliary condenser with circulating pump, air-pump, feed filter and feed pump is fitted to admit of the corresponding auxiliary machinery used on service being opened out for cleaning and ex-

amination as necessary. All the bearings for the turbine and line shafting are connected to the forced lubrication system, and the oil supply is maintained by four large oil pumps which discharge the oil through special coolers before entering the bearings. Separate pumps are fitted for circulating cold sea-water through the oil coolers. Drain tanks, into which the oil gravitates from the bearings and settling tanks for separating any water or impurities from the oil, are fitted in the condensing room. The pumps for ship's service consist of two general service pumps, three sanitary hot and cold water pumps, two bilge pumps, two fresh-water pumps, and a ballast pump.

Steam is generated in six large double-ended boilers and four single-ended boilers, situated in three separate compartments, and working under the Howden system of forced draught, the air supply being maintained by an installation of electrically driven fans fitted in duplicate and situated on the main deck. Two pole masts and three large and well-proportioned elliptical funnels, one for each boiler compartment, give the vessel a strikingly handsome appearance. For dealing with the ashes at sea, See's ash ejectors are fitted in each stokehold, and in each boiler compartment a specially designed ash ejector pump for supplying the water under pressure to the ejectors is fitted. Steam ash hoists of a silent type are also fitted in each boiler compartment for harbour service. The ash hoisting arrangements have received special consideration in order to minimise the noise which is so objectionable, and this machinery has therefore been removed entirely from the vicinity of the passenger quarters.

THE ALLAN LINER CALGARIAN

The approval, which the novel features embodied in these two new vessels has met with in ship-owning circles may be gauged from the fact that the Fairfield Shipbuilding Company have already launched a new turbine steamer of similar design. This is the Calgarian destined to ply between Liverpool and the St. Laurence in the service of the Allan Line. A quadruple screw turbine steamer of 590 feet length, 70 feet beam and 54 feet in depth to bridge deck, she is of 18,500 tons gross and will have a service speed of 18 knots. Fitted like the Empress steamers with straight stems and cruiser stern with underhung and submerged rudders, she resembles these vessels very closely in external appearance. As in the case of these steamers her propelling machinery will also consist of four Parsons turbines of latest design similar to those of the Empresses. She will carry 200 first-class, 500 second-class and 1,000 third-class passengers, and the arrangements for the safety of the ship and her passengers contain all the latest improvements. These include automatically self-closing watertight doors in bulkheads on the Stone-Lloyd system, a double bottom extending well up the bilges, while in case of ultimate necessity there will be sufficient boats to carry all on board as well as a life jacket for each person.

In addition to the usual light and sound signals and a powerful wireless installation, the Calgarian will be fitted with submarine signalling apparatus, which will enable those in charge to ascertain the relative position of any ship or station similarly equipped.

The Georgian style will rule in all the public rooms and cabins of the Calgarian.

"THE FAIRFIELD RECORD"

The Fairfield Company has a wonderful record of success in the building of merchant vessels and yachts of all classes. The following well-known steamers are Fairfield productions: The Atlantic liners Campania, Lucania and Empress of Britain, the South African liners Armadale and Balmoral Castle, etc., the Egyptian mail turbine steamers Heliopolis and Cairo, and a long list of ocean and channel turbine steamers. Among yachts the following

productions of the famous yard are noteworthy: the Imperial steam yacht Livadia built for the Czar Alexander II, the Spanish Royal yacht Giralda, and the Lady Torfrida, the property of Sir Marcus Samuel. In war vessels of all classes and for many governments the record of the yard is no less remarkable. The British battle cruiser Indomitable which conveyed His Majesty, when Prince of Wales, to the Centenary Celebrations in Quebec, scored a notable success by her record run across the Atlantic, at an average speed of 24.8 knots. Other successes have been the battle-ship New Zealand, the cruiser scout Forward, and a whole host of destroyers, torpedo boats and other craft. The Fairfield Shipbuilding Company are closely associated with Messrs. Cammell Laird & Co., Ltd., of Sheffield, Birkenhead, etc., and the Coventry Ordnance Works, Ltd., and the combined resources of the three companies enable them to build, engine, arm and equip to the last detail war vessels of any class whatever. The three companies are all represented in the Far East by Messrs. Samuel & Co., Ltd., of Shanghai, etc.

THE NEW SINO-JAPANESE COMPANY.

The China Development Company, Ltd., of Japan, held its inauguration meeting on 11th Aug. in Tokyo. Mr. Kurachi, formerly Vice-Minister of Foreign Affairs, who is now a member of the House of Peers, was elected as Vice-President. Mr. Ozaki (formerly of the Mitsui Bank) and Yin Hsi-chang (of Shanghai), Managing Directors, Mr. Mori (of Mitsui and Co. of Shanghai), Wang I-ting and Chang Jen-chi, Directors, while Mr. Ohasi and Shen Man-yun, the auditors, were elected at the meeting.

The China Development Company, Ltd., has a capital of Yen 5,000,000, each divided into 50,000 shares Yen 100. Most of the leading Japanese concerns have become shareholders, among whom the following may be mentioned:—

	Shares.
Industrial Bank of Japan Ltd...	1,000
Nippon Yusen Kaisha	1,000
Osaka Shosen Kaisha	1,000
Mr. Yagyu (President of Bank of Taiwan)	1,000
Mitsui & Co., Ltd.	1,000
Mitsu Bishi & Co., Ltd.	1,000
Okura (Proprietor of Okura & Co.)	700
Sumitomo	700
South Manchuria Railway Company	600
Baron Shibusawa	600
The 1st Bank	500
The 100th Bank	500
Nakagawa (Vice-President Bank of Taiwan)	500

and many others, of whom Messrs. Inouye, Odagiri, the Directors of the Yokohama Specie Bank, and Nisshin Kisen Kaisha may be mentioned.

The objects of the Company are numerous, among which the following may be mentioned:—

- 1.—To undertake investigation, designs and plans, to take up or introduce any development enterprise in China.
- 2.—To finance such enterprises, either directly or indirectly.
- 3.—To accept any bonds or undertake the same.
- 4.—To finance or take up trusteeship.

The main office will be at Tokyo and a branch in Shanghai.

There are many Chinese shareholders, mostly of Shanghai, including Chu Pao-san, Ku Shan-yi, Wu Ching-tang (of Kobe), Wang I-ting, Chang Jen-chi, Li Ping-su, Chow Shin-kau, Yin Hsi-chang, etc.

KOWLOON-CANTON RAILWAY

(British Section)

ANNUAL REPORT FOR 1912

Mr. H. P. Winslow, Manager of the British Section of the Kowloon-Canton Railway, in his report for 1912 says:—

Construction

At the end of 1911 little construction work remained to be done with the exception of building the Terminal Station at Kowloon. The site for this has been under discussion during the year and it was finally decided to purchase K.M.L.'s 3, 9, 74 and 75. It was also necessary to acquire a portion of the land in the occupation of Messrs. Holt & Co. to gain access to the proposed New Station, and this has been arranged by exchange of an equal portion from Railway property. Mr. A. B. Hubback, F.R.I.B.A., Government Architect for the Federated Malay States, was, by the courtesy of the Chief Commissioner, appointed architect and submitted plans before the end of the year, which were approved. Work was commenced by raising the Praya Wall at Kowloon Point to such a level as to ensure the safety of the Yard against flooding during typhoons. The demolition of the warehouses and other buildings on the site was completed, the Head Offices of the Railway being transferred to a temporary building which on the completion of the new Station will be converted into quarters for the Staff. A considerable amount of preliminary work has also been done in the laying out of temporary sidings, the collection of building materials and the transportation of these to the site.

2. The pitching, draining and plastering of Cuttings Nos. 1 and 44 have been completed. An extensive catchwater drain above Cutting No. 47 has also been constructed, and it is hoped that this Cutting will give no further trouble.

3. The Engine Pits in the Locomotive Running Shed mentioned in my last report were lengthened during the year to accommodate the two new Main Line Engines, and a contract for the construction of an extension to the Shed over these pits has been let to a local firm.

4. The Branch Line from Fanling to Sha Tau Kok was completed and opened to traffic on April 1st. Two sidings were laid, one at 1½ and one at 4 Miles and a passing loop at Wo Hang Station.

Station Shelters have also been erected at each of the four Stations. This line is not ballasted with stone and considerable attention had to be given to it during the wet weather, but it is now in good running order.

Maintenance.

5. There have been no slips to either Cuttings or Banks during the year. The pitching to Bridge No. 10 (3 Spans of 40 feet, 40 feet high) was badly blown round the South abutment and the necessary repairs have been carried out.

6. The Main Line is now in a high state of efficiency. The road bed has become thoroughly consolidated and safe for the fastest speeds required. It was found necessary to lengthen the Sidings at Kowloon and Fanling Stations and to provide a fourth road of 1,200 feet at Hung Hom Station, for shunting operations.

7. The Signalling System has been improved by the adoption of a key box at each station, which holds the keys for locking the facing points, and only allows the proper combination of keys to be withdrawn at one time, all other keys remaining locked in until the first are returned. An advance Outer Signal has been erected at Hung Hom over the big Cutting. The work for the above was executed in the Railway Workshops.

8. The two additional Locomotives ordered from Home in 1911 and expected early in the year only arrived in the Colony on June 14th. The erection of the first was begun on June 22nd and she left the shops on Monday, July 8th, for her first steam trial, and was handed over to the Traffic Department on July 19th. The second made her first trial run on July 29th and was available for Traffic on August 2nd.

9. The erection of eight new carriages was commenced on the 13th of March. The first was completed on May 27th and the last on August 20th. All the First and Second Class Coaches have been fitted with electric fans.

10. For the Fanling Branch six two-foot Gauge Wagons with a capacity of 62 cubic feet were built and the six passenger Coaches were also fitted with new underframes with dust proof axle boxes.

11. The following are the most important works carried out in the Workshops during the year:—

One Second Class Carriage converted into First and Second Buffet Compo.

One Third Brake converted into Kitchen Brake

One Third Class into Second Class.

Two 30-Ton Covered Goods converted into Emergency Thirds to carry 100 Passengers each.

No. 5 First and Second Class Compo, was taken into the shops on September 2nd for general overhaul and revarnishing and returned to Traffic on October 4th.

No. 5 Hudswell Clarke Saddle Tank Locomotive has been thoroughly overhauled and fitted with axle boxes and a new fire box.

No. 1 Kitson Loco was supplied with a new set of coupled wheel axle boxes, the castings being obtained locally and machined in the shops.

12. As already stated two locomotives were expected early in the year, but did not actually arrive until the end of June. Some anxiety was occasioned when it became necessary to inaugurate an increased train service and, although only two locomotives were available, I am glad to say that this was effected and the service efficiently maintained, which reflects great credit on the Locomotive Staff.

Account—Capital.

13. The Expenditure to December 31st, 1911, on the Construction of the Railway was for the Main Line \$11,984,515.13 and for Fanling Branch Line \$36,987.64, making a total of \$12,021,502.77.

During the year under report a further sum of \$1,783,093.00 was voted by the Legislative Council. The purchase of the Station Site and also of Kowloon Inland Lot No. 1,132 for a residence for the Manager accounted for \$1,515,879.25 and the two Locomotives and eight Coaches ordered in 1911 were paid for, the total under Main Line Account being \$1,729,550.54, but credits afforded by sale of Construction Plant and profit on exchange reduced that figure by \$487,418.58 and the net expenditure for the year stands at \$1,242,131.96. On the Fanling Branch the 14 lb. rails put in were replaced by a heavier section rail. The amount expended was \$20,790.55. The Expenditure against the Grant of \$1,783,093.00 was \$1,262,922.51 and shows a saving of \$520,170.49.

Revenue and Expenditure.

14. The Revenue statement of earnings and expenditure shown in this Report follow the

lines adopted last year. The Expenditure of all Departments has been carefully watched, and apart from the \$25.88 shown as Special and Miscellaneous, the Estimates have been exceeded only in the case of Locomotive Expenses. The Excess under this heading amounts to \$22,694.10 and is mainly due to an inadequate estimate of the amount of Coal required, only \$13,500 being provided while the actual cost of Coal consumed was \$20,743.99. It is probable that the improved Train Service was not contemplated at the time the Estimate was prepared.

15. The provision under General Stores also proved insufficient, and in addition it was found necessary to fit a new set of axle boxes to No. 1 Locomotive.

16. It will be observed that the Working Expenses compared with Gross Receipts show a marked decrease on the previous year. The actual working expenses were \$207,350.78 against an estimate of \$200,973.00. The Excess in the Locomotive Expenses, which is fully explained in the preceding paragraph, was reduced by savings in other Departments and the total Estimate was exceeded only by \$6,377.78.

Revenue.

17. In view of the unsettled conditions prevailing in the Kwangtung Province it was not to be expected that Through Passenger Traffic would reach the estimated figure, and although fares were reduced and every encouragement offered, the Revenue from this source was disappointing. An increase of both passenger and goods traffic might be looked for when connection is made with the Canton-Hankow Railway.

18. The Revenue derived from Local Passenger Traffic is slightly less than in 1911. Every effort was made to secure goods, but development is slow and through goods traffic has been discouraged by the imposition of Likin. It is hardly likely that much improvement will be shown under the existing conditions.

19. It is gratifying to note that the Revenue exceeded working expenses by \$34,298.24 which under the adverse circumstances may be considered satisfactory. Interest on Capital Account has not, however, been included in the Railway Account this year, as it was decided to debit this in future to the Public Debt.

20. It is regretted that the subject of Division of Joint Sectional Passenger Fares is still in abeyance, but it is hoped that this difficult question will soon be settled when the final adjustment between the two Sections may be affected.

21. I am pleased to report that the transactions of the Stores Branch have been efficiently carried out. The Stores are in excellent order and demands generally have been promptly met. Tenders were called for at the end of 1911 for all Local Supplies for 1912.

22. A revised list of Plant for Sale has been prepared and circulated and every effort has been made to dispose of Construction Plant and Stores but sales have been few as very little work has been in progress on which Plant of such a nature would be required.

23. No fatal accident occurred to the travelling public during the year and only one passenger sustained injury due to alighting from the Express Train in motion. There were no accidents to Railway servants. In spite of all precautions Chinese continue to trespass on the Railway and four were killed.

24. There have been no changes in the Staff.

CONSTRUCTION ACCOUNT—Main Line.

I.	II.	III.	IV.	V.	VI.	VII.
Main Head	Sub-head	ESTIMATES.		Expenditure		Funds
		1910.	Additions	Total.	to 31st	Available
		\$ c.	\$ c.	\$ c.	December,	\$ c.
			1912.		1912.	
I.—Preliminary Expenditure	Survey	42,277.65	.....	42,277.65	42,277.65	.....
II.—Land	Land	1,195,879.20	*1,473,879.25	2,669,758.45	2,250,185.25	419,573.20
III.—Formation	(a) Earthwork	2,587,580.00	.....	2,587,580.00	2,558,410.82	29,169.18
	(b) Tunnels	3,811,145.19	.....	3,811,145.19	3,807,482.63	3,662.56
	(c) Roads	120,200.00	.....	120,200.00	118,363.64	1,836.36
IV.—Bridges	(a) Major	816,495.41	.....	816,495.41	829,047.22	12,551.81
	(b) Minor	350,126.47	.....	350,126.47	359,491.49	9,365.02
	(c) Culverts	72,546.09	.....	72,546.09	71,567.78	978.31
V.—Fencing	(a) Boundaries	39,999.45	.....	39,999.45	36,993.11	3,006.34
	(b) Signs	400.00	.....	400.00	640.31	240.31
VI.—Telegraph	Telegraph	30,032.17	.....	30,032.17	36,790.24	6,758.07
VII.—Track	(a) Ballast	130,066.54	.....	130,066.54	158,703.37	28,636.83
	(b) Permanent Way	702,885.71	.....	702,885.71	739,474.89	36,589.18
VIII.—Stations and Buildings	(a) Buildings and Fixtures	308,800.00	.....	308,800.00	192,195.89	116,604.11
	(b) Station Machinery	40,000.00	.....	40,000.00	32,494.95	7,505.05
	(c) Furnitures	5,000.00	.....	5,000.00	12,323.90	7,323.90
	(d) Workshops	60,000.00	.....	60,000.00	80,701.79	20,701.79
IX.—Plant	(a) Construction	101,884.53	.....	101,884.53	176,360.34	74,475.81
	(b) Loco Tools and Plant	50,000.00	.....	50,000.00	68,780.79	18,780.79
	(c) C. & W. Tools and Plant	10,000.00	.....	10,000.00	25.00	9,975.00
	(d) Engineering .....	.....	.....	.....	10.00	10.00
	(e) Loco Rolling Stock	74,400.00	† 45,000.00	119,400.00	193,509.63	74,109.63
	(f) C. & W. Rolling Stock	302,540.00	.....	302,540.00	397,647.12	95,107.12
X.—General Charges	(a) 1. Salaries and Allowances	398,720.43	.....	398,720.43	434,004.64	35,284.21
	2. Quarters and Offices	68,495.13	† 20,000.00	88,495.13	106,323.06	17,827.93
	3. Instruments	11,639.61	.....	11,639.61	10,449.91	1,189.70
	4. Office Expenses	32,710.93	.....	32,710.93	33,573.72	862.79
	5. Medical	22,319.46	.....	22,319.46	23,071.90	752.44
	6. Home Charges	124,478.29	.....	124,478.29	134,978.80	10,500.51
	7. Interest	713,922.67	.....	713,922.67	701,705.62	12,217.05
	8. Exchange	200,000.00	.....	200,000.00	584,506.31	784,506.31
	(b) Accounts	42,843.53	.....	42,843.53	41,222.35	1,621.18
	(ss) Stores in Suspense .....	.....	.....	.....	162,345.59	162,345.59
		\$ 12,467,388.46	1,538,879.25	14,006,267.71	13,226,647.09	779,620.62

N.B.—Figures printed in italics are minus quantities.

* Financial Minute No. 25

† Special Expenditure, *vide* 1912 Estimates, page 91.

Fan Ling Branch

Construction 2' o' Gauge.

I.	II.	III.	IV.	V.
Item No.	Main Head.	Sub-Head.	Revised Estimate.	Expenditure to 31st December, 1912.
			\$ c.	\$ c.
1. Land	2,364.21
2. Earthwork	2,364.21
3. Track Ballast	11.05
4. Track—Permanent Way	1,988.95
5. Station Buildings	12,911.38
6. Locomotives	400.32
7. Carriages	7,046.40
8. Salaries	1,478.33
				690.40
			\$ 54,107.00	\$ 57,778.19
				\$ 3,671.19

Item No. 1.—No provision in Revised Estimate.

Item No. 2.—Work under this Head is chargeable to Public Works Extraordinary.

Figures printed in italics in Column V denote excess of Estimate.

CONSTRUCTION ACCOUNT—Fanling Branch.

Table of Expenditure, 1912.

Item No.	Main Head.	Sub-Head.	Expenditure to 31st December 1911.	Expenditure during 1912.	Expenditure to end of 1912.
1. Land	II	.....	2,200.00	164.21	2,364.21
2. Track Ballast, ..	VII a	.....	.....	11.05	11.05
3. Track, Permanent Way, ..	VII b	.....	25,405.95	16,812.43	42,218.38
4. Station Buildings, ..	VIII a	.....	471.63	328.05	799.68
5. Locomotives, ..	IX e	.....	6,458.06	95.54	6,553.60
6. Carriages, ..	IX f	.....	2,142.40	3,379.27	5,521.67
7. Salaries, ..	X a 1	.....	309.60	.....	309.60
			\$36,987.64	\$20,790.55	\$57,778.19

FANLING BRANCH LINE.

Maintenance of Way, Works and Stations.

Current Year.

ABSTRACT A.	\$ c.
1. Overseer in Charge,	461.74
2. Platelayers,	1,512.34
3. Stores, Oil, etc.,	18.60
	1,992.68
ABSTRACTS B & C.	
Locomotive Carriage and Wagon Expenses.	
1. Wages, Drivers and Firemen,	1,127.35
2. Labour, connected with fueling, cleaning and looking after Engines in Yard,	99.31
3. Contingent Expenses, including Clothing and Travelling Expenses,	20.00
4. Labour, including Wages of Oilers, Carriage Cleaners and Examiners,	64.45
5. Oil, Tallow and Other Stores expended on Engines in Work,	450.33
6. Coal,	1,630.85
7. Wages, Repairs and Renewal of Vehicles,	686.41
8. Materials, Maintenance and Renewals of Locomotive, ..	629.76
	4,708.46

ABSTRACT D.

Traffic Expenses.

1. Conductors,	874.23
2. Brakemen,	86.22
3. Allowances to Staff in lieu of Quarters,	20.00
	980.45

ABSTRACT E.

General Charges.

1. Printing Time Tables, etc.,	4.00
	4.00
Total,	\$7,685.59

CONSTRUCTION ACCOUNT—Main Line.

Table of Expenditure and Statement of Credits for the year 1912.

I. Main Head.	II. Sub-Head.	III. Expenditure to 31st December, 1911. \$ c.	IV. Expended during 1912. \$ c.	V. Less Credits by Exchange and Sales during 1912. \$ c.	VI. Net Expenditure \$ c.	VII. Expenditure to 31st December 1912. \$ c.
I.—Preliminary Expenditure,.....	Survey,.....	42,277.65	....	....	....	42,277.65
II.—Land,.....	Land,.....	776,774.45	1,473,879.25	468.45	1,473,410.80	2,250,185.25
III.—Formation,.....	(a) Earthwork,.....	2,551,554.45	6,856.37	....	6,356.37	2,558,410.82
	(b) Tunnels,.....	3,808,582.63	....	1,100.00	1,100.00	3,807,482.63
	(c) Roads,.....	118,363.64	....	....	....	118,363.64
IV.—Bridge Work,.....	(a) Major,.....	829,047.22	....	....	....	829,047.22
	(b) Minor,.....	359,491.49	....	....	....	359,491.49
	(c) Culverts,.....	71,567.78	....	....	....	71,567.78
V.—Fencing,.....	(a) Boundaries,.....	36,469.67	523.44	....	523.44	36,993.11
	(b) Signs,.....	640.31	....	....	....	640.31
VI.—Telegraph,.....	.....	36,790.24	....	....	....	36,790.24
VII.—Track,.....	(a) Ballast,.....	158,634.97	68.40	....	68.40	158,703.37
	(b) Permanent Way,.....	729,555.34	9,919.55	....	9,919.55	739,474.89
VIII.—Stations and Buildings,.....	(a) Buildings and Fixtures,.....	176,300.70	15,975.19	80.00	15,895.19	192,195.89
	(b) Station Machinery,.....	32,143.12	351.83	....	351.83	32,494.95
	(c) Furniture,.....	11,293.28	1,030.62	....	1,030.62	12,323.90
	(d) Workshops and Stores,.....	77,293.75	3,408.04	....	3,408.04	80,701.79
IX.—Plant,.....	(a) Construction,.....	185,535.58	231.75	9,406.99	9,175.24	176,360.34
	(b) Loco Tools and Plant,.....	65,307.87	3,472.92	....	3,472.92	68,780.79
	(c) C. & W. Tools and Plant,.....	25.00	....	....	....	25.00
	(d) Engineering Tools and Plant,.....	10.00	....	....	....	10.00
	(e) Loco Rolling Stock,.....	110,611.03	82,898.60	....	82,898.60	193,509.63
	(f) C. & W. Rolling Stock,.....	289,445.51	108,201.61	....	108,201.61	397,647.12
X.—General Charges,.....	(a) 1. Salaries and Allowances,...	433,172.65	831.99	....	831.99	434,004.64
	2. Temporary Quarters and Offices,.....	63,335.54	42,987.52	....	42,987.52	106,323.06
	3. Instruments,.....	10,654.03	51.40	255.52	204.12	10,449.91
	4. Office Expenses,.....	33,455.53	118.19	....	118.19	33,573.72
	5. Medical,.....	23,071.90	....	....	....	23,071.90
	6. Home Charges,.....	134,329.92	648.88	....	648.88	134,978.80
	7. Interest,.....	701,705.62	....	....	....	701,705.62
	8. Exchange,.....	110,997.29	100.62	473,609.64	473,509.02	584,506.31
	(b) Accounts,.....	41,222.35	....	....	....	41,222.35
	(ss) Stores in Suspense,.....	186,769.20	22,005.63	1,417.98	23,423.61	162,345.59
	Bricks,.....	1,080.00	....	1,080.00	1,080.00	....
Total,.....		11,984,515.13	1,729,550.54	487,418.58	1,242,131.96	13,226,647.09

N.B.—Figures printed in italics minus quantities.

REVENUE ACCOUNT for the year ending December 31, 1912.

1911	Per cent. on Gross Receipts	Expenditure	Abstract	Amount	Per cent. on Gross Receipts	1911	Earnings	Abstract	Amount	Total
\$ c.	%	Main Line.		\$ c.	%	\$ c.	Local		\$ c.	\$ c.
34,272.26	23.31	To Maintenance of Ways and Works,.....	A	42,422.14	17.56	107,398.05	By Coaching Traffic . . .	G	93,300.19	
51,560.62	35.06	" Loco, Carriage and Wagon Expenses . . .	B & C	84,616.10	35.02	12,515.41	" Goods " . . .	H	8,649.74	
32,902.29	22.37	" Traffic Expenses . . .	D	38,333.06	15.86	11,729.24	" Sundry " . . .	I	14,874.54	
53,121.77	36.12	" General Charges . . .	E	34,268.01	14.18	131,642.70	Foreign.			116,824.47
47.00	03	" Special and Miscellaneous Expenditure . . .	F	25.88	01	15,317.64	By Coaching Traffic . . .	G	111,432.96	
						98.46	" Goods " . . .	H	7,139.15	
						..	" Sundry " . . .	I	..	
		Branch Line.				15,416.10	Branch Line.			118,572.11
		To Maintenance of Ways and Works,.....	A	19,992.68	82		By Coaching Traffic . . .	G	5,782.72	
		" Loco, Carriage and Wagon Expenses . . .	B & C	4,708.46	1.95		" Goods " . . .	H	415.72	
		" Traffic Expenses . . .	D	980.45	41		" Sundry " . . .	I	24.00	
		" General Charges . . .	E	4.00	..					6,252.44
										241,649.02
171,903.94	116.89	" Balance Net (Earnings).		207,350.78	85.81	147,058.80				
				34,298.24	14.19					
24,845.14	16.89	" Loss on Working . . .								
147,058.80	100.00			241,649.02	100.00	147,058.80				241,649.02

N.B.—Fanling Branch not in operation prior to 1912.

ABSTRACT A.

Previous Year	Maintenance of Way, Works & Stations.	Current Year.			
\$ c.		\$ c.			
	<i>I.—General Superintendence:—</i>		1,233.58	2.—Stores, including Oil Grease and other stores for consumption on Vehicles .	1,588.43
6,646.07	1.—Salaries and Allowance of Engineers .	6,092.26	6,047.65		4,246.43
1,171.93	2.—Sub-Inspectors' Salaries	3,430.87	12,817.15	<i>III.—Coal:—</i>	29,743.99
	3.—Allowances	365.81	165.04	1.—Labour "Bunkering"	636.07
671.24	4.—Office Staff and Expenses	3,165.66	—	2.—Wood	116.00
8,489.24		13,054.60	12,982.19	<i>IV.—Water, including Wages and Stores. . .</i>	30,496.06
	<i>II.—Maintenance and Renewal of Track:—</i>		91.22		55.21
17,756.36	1a.—Wages—Ordinary Gangs.	11,858.90	2,609.57	<i>V.—Oil, Tallow and other Stores expended on Engines in Work</i>	4,780.62
	1b.—Wages—Extra Gangs.	2,447.93		<i>VI.—Maintenance and Renewal of Locomotive Engines:—</i>	
6,811.14	2a.—Ballast	3,436.37	4,278.71	1.—Wages	9,313.31
468.87	2b.—Stores, Oil and Waste	1,087.77	37.84	2.—Overtime Allowance	—
94.50	2c.—Rails	112.20	2,460.08	3.—Material	10,711.71
	2d.—Sleepers	46.40	6,776.63		20,025.02
1.20	2e.—Fastenings	—		<i>Via.—Repairs and Renewals of Vehicles.</i>	
25,132.07	2f.—Points and Crossings	49.58		1.—Coaching Vehicles:—	
		19,039.15	554.43	1.—Wages	2,826.54
	<i>III.—Repairs of Bridges, etc.:—</i>		479.77	2.—Overtime Allowance	213.00
	1.—Bridges and Tunnels	483.89		3.—Material	3,313.92
	2.—Earthwork	4,468.97	1,034.20		6,353.46
2.00	3.—Fencing	84.01	3,374.77	2.—Goods Vehicles:—	
	4.—Roads and Level Crossings	80.70	34.87	1.—Wages	1,344.58
22.70	5.—Miscellaneous Expenses	15.46	405.26	2.—Overtime Allowance	39.76
24 70		5,133.03	3,814.90	3.—Material	447.69
	<i>IV.—Repairs of Station Building and Structures.</i>				1,832.03
626.25	1.—Repairs to Building of every description, including Station Yards and Signals .	1,506.35		<i>VII.—Maintenance and Renewals of Machinery, Tools and Plant:—</i>	
	2.—Staff Quarters	1,200.79	184.93	1.—Wages	1,316.37
626.25		2,707.14	204.39	2.—Overtime Allowance	—
	<i>V.—New Minor Works</i>	2,303.11		3.—Material	3,083.40
	<i>VI.—Unclassified Expenditure.</i>		389.32		3,399.77
	1.—Plantations	—	\$51,560.62	Total	\$84,616.10
	2.—Tools and Plant	185.11			
		185.11			
\$34,272.26	Total,	\$42,422.14			

Mileage maintained by Revenue:—

Double Line,	Nil.
Single Line,	22 Miles.
Sidings,	8 do.
Total Single Track, including sidings,	30 do.
Cost per Mile,	\$1,414.07

ABSTRACTS B AND C.

Previous Year.	Locomotive Carriage and Wagon Expenses.	Current Year			
\$ c.		\$ c.			
	<i>I.—General Superintendence:—</i>		739.05	4a.—Wages	707.61
6,457.18	1.—Salary of Superintendent	3,655.36	47.28	4b.—Stores	43.22
1,041.05	2.—Allowance	—	28,697.30		32,337.32
1,306.34	3.—Subordinate Superintendent	—		<i>II.—Fuel, Lighting and General Stores:—</i>	
8,804.57	4.—Office Staff and Expenses	1,575.01	973.09	1.—Fuel, Lighting, Water and General Stores for Stations and Offices	1,977.31
		5,230.37	1.62	2.—Wagon and Covers, Ropes, &c.	272.24
	<i>II.—Running Expenses, Wages connected with Working of Loco Engines:—</i>		974.71	3.—Office and Station Fittings and Furnitures	2,249.55
5,955.83	1.—Drivers and Firemen, etc.	3,615.73	553.80		1,711.45
372.23	2.—Overtime Allowance	393.78	1,907.59	<i>III.—Clothing.</i>	—
1,430.86	3.—All labour connected with fuelling, cleaning and looking after Engines in Yard .	2,208.35		<i>IV.—Printing:—</i>	
1,251.45	4.—Contingent Expenses, including allowances in lieu of Quarters, etc.	1,979.27		Cost of Tickets, &c.	1,521.89
9,010.37		8,197.13		Salary of Printer	480.00
	<i>IIa.—Running Expenses, in connection with Cleaning Carriages and Wagons:—</i>				2,001.86
4,814.07	1.—Labour, including Wages of Oilers, Carriage cleaners and Examiners	2,658.00	768.89	<i>V.—Charges for Delivery & Collection of Goods, &c.</i>	—
			3,230.28	<i>VI.—Miscellaneous Expenses</i>	32.85
			\$32,902.29	Total	\$38,533.06

ABSTRACT E.		
Previous Year.	General Charges.	Current Year.
\$ c.		\$ c.
<i>I.—Management, including Offices:—</i>		
26,022.64	1.—Controlling Office	11,734.98
9,774.46	2 & 3.—Audit and Accounts Office	7,914.95
—	4.—Pay Office	2,103.23
4,928.57	5.—Stores	5,789.14
1,668.00	6.—Medical	—
1,517.32	7.—Conservancy	1,817.91
2,645.00	8.—Rent of Buildings and Land	1,234.38
899.59	9.—Furniture, Fittings, etc..	1,611.32
1,250.66	10.—Printing and Stationery	424.83
41.60	11.—Medicine and Contribution to Hospital	—
—		—
48,747.84		32,630.74
<i>II.—Police:—</i>		
—	1.—Supervision	199.00
2,222.37	2.—Constables	1,093.66
241.72	3.—Contingencies (Watch and Ward other than 1 and 2)	—
—		—
2,464.09		1,292.66
<i>III.—Advertising:—</i>		
—	Advertisement of all Departments	344.61
1,909.84		—
—		—
\$53,121.77	Total	\$34,268.01

453,121.77		ABSTRACT F.	Total	\$37,208.01
Previous Year,	Special and Miscellaneous Expenditure.		Current Year,	
\$			\$	
—	I.—Land Charges		—	
—	II.—Compensation		—	
47.00	1.—For Goods lost or damaged		7.88	
—			—	
47.00			7.88	
—	III.—Rates and Taxes including Municipal			
	Water Rates		—	
—	IV.—Prizes for best kept length of road		18.00	
—			—	
\$47.00			Total.	\$25.88

ABSTRACT H.				
Goods Traffic.				
Local Earnings.				
Previous Year.	Particulars.	No.	Amount.	
\$ c.			\$	c.
12,515.41	General Merchandise, Piculs.	142,465.72	7,268.59	
.....	Government Stores, „	3,349.00	1,077.72	
.....	Live Stock, Number	1,422.00	303.43	
<hr/> \$12,515.41	Total,.....		\$	8,649.74
N.B.—16.75 Piculs are taken as the equivalent of a ton.				

ABSTRACT I.			
Sundries.			
Local Earnings.			
Previous Year.	Particulars.		Current Year.
\$	c.		\$ c.
7,800.00		Rents of Land,	11,652.52
720.75		Rents—Stall Holders, Money Changers at Stations,	419.00
1,987.95		Hire of Engines and Wagons (Maintenance),	2,194.37
354.64		Water Supply to Steam Launches,	399.15
.....		Storage,	1.00
865.00		Wharfage—Blackheads Point,	155.00
—		Telegraph,	2.05
... ..		Sale of Ashes,	20.00
.90		Proceeds by sale of Lost Luggage,	1.00
.....		Miscellaneous.	30.45
<hr/>			<hr/>
\$11,729.24		Total,	\$ 14,874.54

From 7th October to 31st December, 1911.		Current Year.	
Particulars.		Particulars.	
Number.	Amount.	Number.	Amount.
	\$ c.		\$ c.
2571½	.....	First Class,	1,391½
1,218½	.....	Second Class,	6,795
14,424½	6,829.16	Third Class,	114,204
			51,156.15

.....	23.58	Passengers' Luggage, Parcels, Excess Fares, . . . . .	.....	35.42
15,900½	6,852.74		122,390½	51,191.57
		<i>Inwards.</i>		
466	.....	First Class,	1,882	.....
2,395	.....	Second Class,	7,382	.....
13,803	8,417.00	Third Class,	125,319	59,493.90
.....	47.90	Passengers' Luggage, Parcels, &c., &c. . . . .	.....	747.49
32,564½	\$15,317.64	Total,	256,973½	\$111,432.96

		ABSTRACT H.			
		Goods Traffic.			
From 7th Octo- ber to 31st December, 1911.		Foreign Earnings.			
		Particulars.		Current Year.	
				Number.	Amount.
		General Merchandise.			
\$	c.				\$ c.
.....		Inwards	Piculs,	58,511	3,544.67
98.46		Outwards	„	72,743	3,594.48
<hr/>				<hr/>	
\$98.46		Total,		131,254	\$7,139.15

ABSTRACT G.					
Fanling Branch Earnings.					
Coaching Traffic.					
		Third Class only.		Total.	
Single Fare per Mile.		About 3 cents.			
I.—Passengers.	Number.	Amount.	Number.	Amount.	
		\$ c.		\$ c.	
Ordinary,	42,919	5,361.35	42,919	5,361.35	
Monthly,	21	90.00	21	90.00	
Total,	42,940	5,451.35	42,940	5,451.35	
II.—Parcels,		Piculs	252.64	19.97	
III.—Country Produce, . .		do.	1,562.00	311.40	
Total,				\$5,782.72	

ABSTRACT H.			
Fanling Branch Earnings.			
<i>Goods Traffic.</i>			
Particulars.	Number.	Amount.	
		\$	c.
General Merchandise,	Piculs 4,036.50	408.	59
Government,	do. 412.50	37.	13
Total,		\$	445.72

ABSTRACT I.	
Fanling Branch Earnings.	
<i>Sundries.</i>	
Particulars.	Current Year.
	\$ c.
Rent of Land,	24.00
Total,	<u>\$ 24.00</u>

N.B.—Fanling Branch not in operation prior to 1912.

Statement of Train Mileage.			
Year ending 31st December, 1911.		MAIN LINE. Particulars.	Year ending 31st December, 1912.
<i>Miles.</i>			<i>Miles.</i>
49,286	1.—Train miles run for Public Traffic .		84,096
1,203	2.—Train miles run for Maintenance .		1,543
<hr/>			<hr/>
50,489	Total Train Mileage		85,639
16,425	3.—Miles of engines shunting and standing in steam for traffic purposes at 6 miles an hour,		73,656
.....	4.—Miles run for Loco purposes,		1,500
<hr/>			<hr/>
66,914	Total,		160,795

Year ending 31st December, 1911.	FANLING BRANCH. Particulars.	Year ending 31st December, 1912.
.....	Train miles run for Public Traffic . . .	18,948
.....	Miles of engines shunting and standing in steam for traffic purposes at 6 miles an hour	10,800
		<hr/> 29,748
.....	N.B.—Fanling Branch not in operation prior to 1912.	

N.B.—Fanling Branch not in operation prior to 1912.

STATEMENT OF ROLLING STOCK for the year ending 31st December, 1912.

DESCRIPTIONS.							1	2	3	4	5	6	7	8	9	10	11
LOCOMOTIVES.							Repairs and Renewals.										
Tender or Tank.	Type.	No.	Cylinder.	Pressure per sq. in.	Tractive Force.	Total Weight in Working Order.	Total Stock at end of previous year.	Additions during the year.	Reductions during the year.	Total stock at end of the year.	Actual stock in running order on the last day of the year.	Number Repaired during the year.	Number Renewed during the year.	Number undergoing or awaiting Repairs on the last day of the year.	Number undergoing or awaiting Renewals on the last day of the year.	Average Number undergoing Repairs or Renewals at any one time.	Stock condemned in this and previous years awaiting replacement.
				lbs.	lbs.	Tons. cwt.											
Side Tank	Kitson 2: 6: 4: 4' 8½" Gauge	4	19" × 26"	180	24,724	89 15	2	2	0	4	4	4	0	2	2	1	0
Saddle Tank	Hudswell Clarke 0: 6: 0: 4' 8½" Gauge	2	14" × 20"	150	10,604	29 7	2	0	0	2	2	2	0	1	1	1	0
Side Tank	Hudswell Clarke 0: 4: 0: 2' 0" Gauge	2	6" × 10"	150	1,800	5 3	2	0	0	2	2	2	0	1	0	1	0
Loco Crane	Wilson & Co. 0: 4: 0: 5-Ton Lift.	1	8" × 10"	80	..	15 0	1	0	0	1	1	1	0	0	0	1	0
Total, . . . 9							7	2	0	9	9	9	0	4	3	3	0
COACHING VEHICLES. 4' 8½" Gauge.							Quantity.	Length of Underframes in feet.	Tare.	Carrying Capacity Passengers.							
First Class Carriages							1	60'11"	36 Ts.	50	1	0	..	1	1	1	..
Second Class Carriage							1	60'11"	34 "	84	1	0	..	1	1	1	..
First and Second Composite Carriages							2	60'11"	35 "	68	1	1	..	2	2	2	..
First and Second Composite and Kitchen Carriages							1	60'11"	35 "	60	0	1	..	1	1	1	2
Third Class Carriages.							8	60'11"	32 "	120	3	5	..	8	8	8	..
Third Luggage and Brake							2	60'11"	35 "	84	1	1	..	2	2	2	..
Kitchen Luggage and Brake.							1	60'11"	35 "	..	*1	0	..	1	1	1	..
Total,							16	..	..	..	8	8	..	16	16	16	2
Coaching Vehicles 2' 0" Gauge.																	
Carriages							6	9' 0"	11 Cwt	10	*Altered from I, II and III Brake.						
Bogie Brake Vans							2	16' 0"	15 "	..							
Goods Wagons							6	9' 0"	10 "	..							
Total,							14	..	..	..				
GOODS VEHICLES.							No.	Length of Underframes in feet.	Tare.	Carrying Capacity (Tons).							
									Ton cwt.								
30-Ton Covered Goods							5	35	15 5	30	5	..	..	5	5	5	..
30-Ton Rail Bogie							1	35	13 8	30	1	..	..	1	1	1	..
30-Ton Open Goods							6	35	14 8	30	6	..	..	6	6	6	..
15-Ton Covered Goods.							16	19	8 10	15	16	..	..	16	16	16	..
15-Ton Converted Goods							8	19	8 10	50 Passengers.	8	..	..	8	8	8	..
15-Ton Cattle Trucks							2	19	8 10	15	2	..	..	2	2	2	..
15-Ton Open Goods							10	19	7 16½	15	10	..	..	10	10	10	..
15-Ton Goods Brake Vans							2	19	15 ..	15	2	..	..	2	2	2	..
Total,							50	..	..	..	50	..	..	50	50	50	..

ABSTRACT G.
COACHING TRAFFIC.
Local Earnings.

Previous Year	Single Fare per Mile.	1st Class		2nd Class		3rd Class		Total	
		About 8 cents.		About 4 cents.		About 2 cents.			
		Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.
	I.—Passenger.								
	Ordinary	1,668	2,522.30	7,645	5,549.65	274,248	70,917.40	283,561	78,989.35
	Government,	662	851.25	1,541	893.90	7,585	2,800.10	9,788	4,545.25
	Monthly,	1	7.50	32	330.10	122	2,056.56	146	2,394.16
	Excursion,	1,627	2,440.50	1,422	1,273.50	1,481	888.40	4,530	4,602.40
	Excess Fare,	48	65.95	133	89.15	1,309	398.30	1,490	553.40
	Aviation,	408½	408.50	..	..	413½	165.40	822	573.90
\$105,271.57	Total,	4,414½	6,296.00	10,764	8,136.30	285,158½	77,226.16	300,337	91,658.46
443.51	Previous Year,	2,910	5,751.46	12,796½	9,378.19	304,072	90,141.92	319,778½	
171.04	II.—Passengers' Luggage,						Piculs.	99.67	18.00
1,510.13	III.—Parcels,						"	10,117.83	192.89
1.80	IV.—Country Produce,						"	12,523.63	2,501.30
	V.—Live Stock,						Number.	....	....
	VI.—Carriages, Horses and Dogs,						"	237.00	73.15
	VII.—Cloak Room Fees,						"	45.00	4.80
	VIII.—Special Trains,						Miles.	135.73	1,026.00
									95,474.60
	Deduct payment to Star Ferry on account of Ferry Service . . . . .						....	....	2,174.41
\$107,398.05								Total,	\$93,300.19

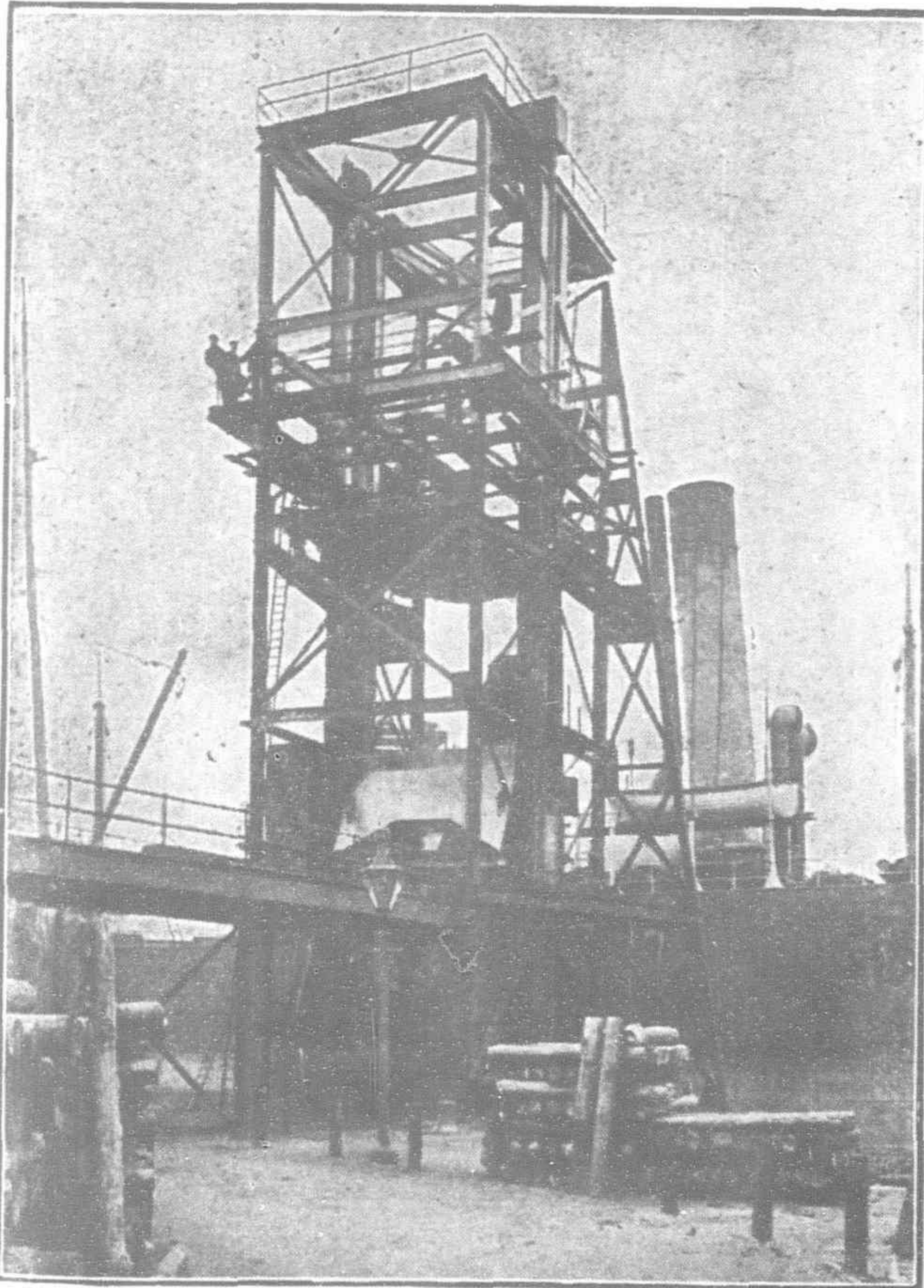
THE PRESERVATION OF IRON
BY "ROSPHALTIC"
SOLUTION

The problem of the cause of corrosion of iron and its prevention has received the consideration of scientists for a number of years. Many theories have been propounded, and much difficult experimental work carried out to prove or disprove these theories. A definite

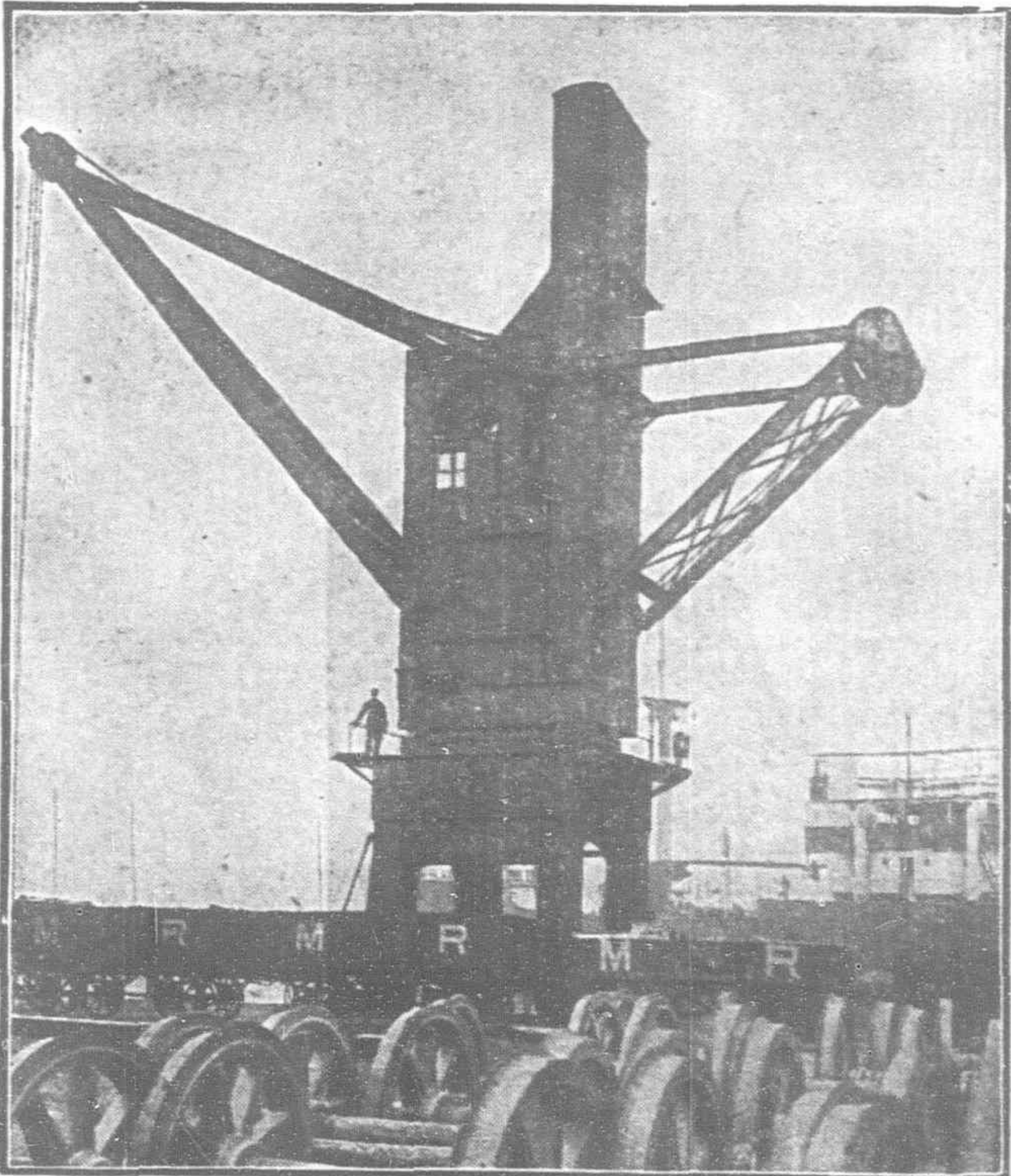
theory for the corrosion of iron has not yet been found, but is apparently not far from being enunciated. The probability is that a combination of what is known as the "acid theory" and the "electrolytic theory" will prove to be the true one, and much experimental work, some of which has been carried out by a member of the firm of Messrs. Rudd & Owen, of Hull, a chemical engineer and technical research chemist, appears to confirm this view.

In spite of the great amount of work carried out by scientists, owners of iron structures do not, as a whole, give that amount of consideration which is due to such an important matter. We cannot do better at this point than bring before our readers the disaster to the Charing Cross Railway Station where the massive structural ironwork roof collapsed with such terrible results. Upon investigation this was found to be entirely due to corrosion weakening the whole structure to its fall. Seeing this structure was under the cover of the glass and coated with paint the natural question is—Why should it corrode? The answers to this are: (1) Ordinary paint is not an efficient iron protective, for reasons which are discussed below; and (2) Iron is very slightly soluble in water; all iron and steels contain softer and harder portions, and electric currents are set up between these portions in the presence of moisture. Acid moisture increases the solubility of iron. The iron in solution, which passes with the current, is precipitated by the oxygen and carbonic acid in the atmosphere, thus forming rust. In the crossing and recrossing of bars, angles, etc., in structural iron-work there is great liability of potential differences being set up at points of contact.

This important subject has been uppermost in the minds of Messrs. Rudd & Owen for some years, and, as mentioned before a member of the firm, has given much time and thought to it. Careful experiments have proved that iron and steel rust very rapidly indeed when moisture and very minute traces of acid bodies are present. In the mists and rains which occur in all parts of the world traces of acids of various kinds always exist; thus rusting occurs the world over. Tiny electro currents, it was found, stimulate corrosion, and the increased use of electricity for lighting and motive power, always accompanied with what are termed "strag currents," render it necessary that immediate consideration be given to methods of protection of all structural work which may come under their influence.



One of 7 Coal Hoists at Alexandra Dock, Hull, coated with "Rosphaltic"



25-ton Electric Crane painted with "Rosphaltic"

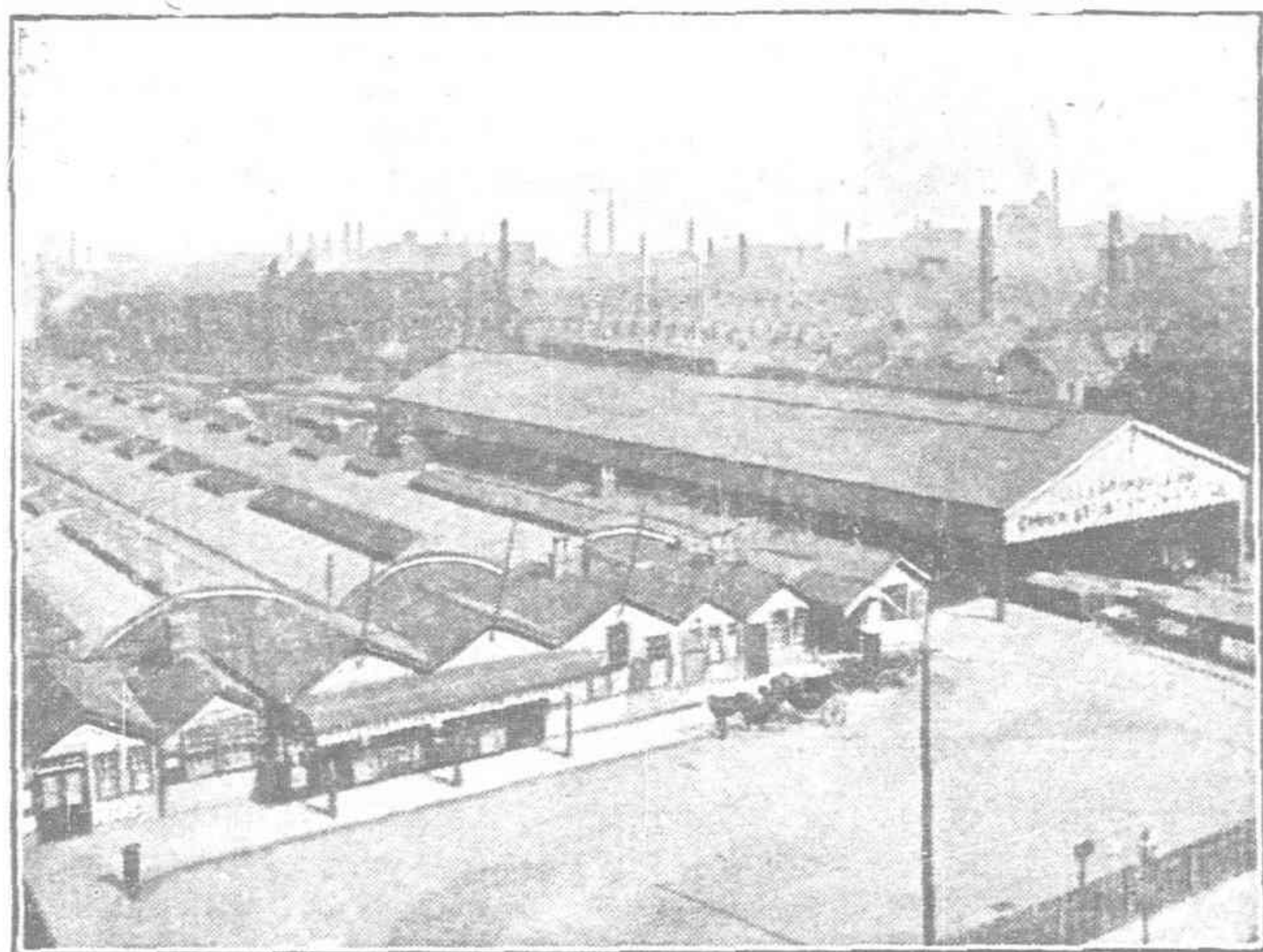
Attention was first paid to the so-called iron protectives which have been in use for a large number of years—the linseed oil paints. Chief amongst these are the red-oxide and the red-lead preparations. On carefully examining the medium, linseed oil, which produces the film and holds the pigment together, it was found that when dry it absorbed moisture from the atmosphere; the average amount absorbed according to many experiments was 4 per cent. Experiments proved that acid bodies, which act upon iron, were formed during the drying of the film and its subsequent exposure to the atmosphere. The pigments employed with the linseed oil, in the average

eighteen months, two years, and longer. These experiments proved conclusively that linseed oil pigment paints (red oxide and other kinds) are inferior as iron protectors.

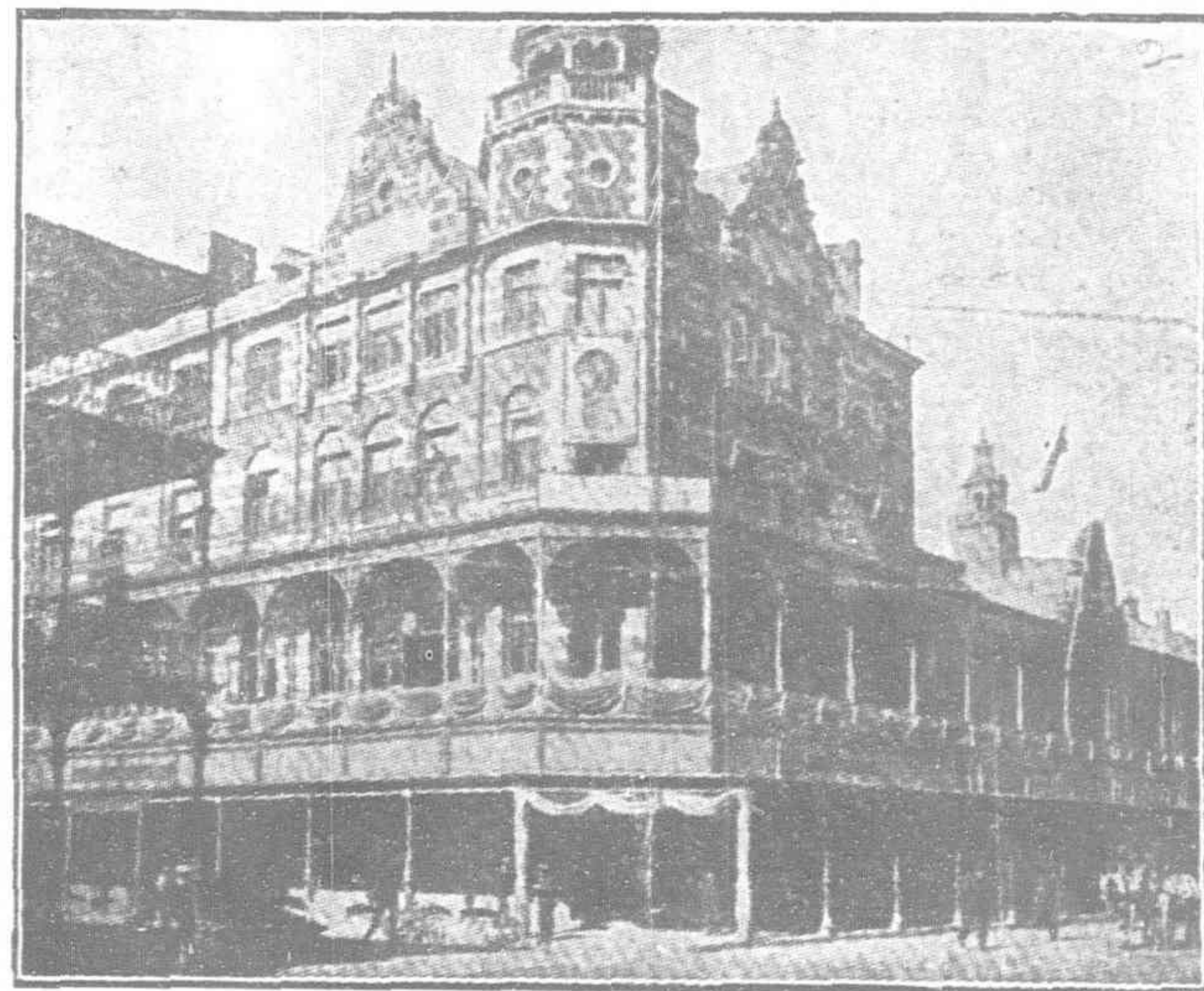
Careful experiments were now carried out with the ingredients of which the best of the controls was made, and with other materials, with the object of making a first-class iron protective solution, possessing great flexibility and lasting power, resistance to the passage of electric currents and moisture, freedom from deposit, high flash point and great covering power. Care was taken also that the materials used should not act upon metal, and should be capable of resisting chemical fumes, salt

The vast importance of the result of Messrs. Rudd & Owen's researches was so manifest to them that they immediately took the precaution of registering the name of "Rosphaltic" for their solution. The title is derived from R. & O.'s asphaltic solution. They have also designed the label which is now used on all barrels, in advertisements, etc., in order that purchasers can become quite familiarised with its form and know that they are getting the genuine solution. All the firm's barrels show their monogram which is also found on packages containing other manufactures of Messrs. Rudd & Owen.

Rudd & Owen are also manufacturers of



Roof of Important Stations in Hull and Barnsley Railway
Painted with "Rosphaltic"



Sports Club, Johannesburg, all Ironwork treated
with "Rosphaltic"

number of cases, proved to be electro-negative to iron: all substances which are electro-negative to iron increase the rate of corrosion.

The results of these investigations clearly pointed out that oil paints, and in particular red-oxide and red-lead paints, are the very worst materials to use for iron protection. Practical experiments were carried out with oxide-oil paints, using preparations made up with materials containing no linseed oil or pigments for comparative purposes (controls). In all cases the oxide-oil paints broke down within nine months, much rust being evident, whilst the controls remained perfect up to periods of

water, etc.

The result of many expensive experiments was Rosphaltic solution, which requires no stirring and possesses all the properties just mentioned, making it the best and at the same time the cheapest iron protective on the market. The important fact that one hundredweight of Rosphaltic solution covers 4,500 square feet of metal surface with two coats, which is three times the area covered by the best oil paints, and very nearly twice the area covered by other preparations, should not be lost sight of. Also its high flash point reduces very considerably the risk of fire.

Rosco Galvanizing Paint (Pure Aluminium) for decorative purposes, Blotil Iron Cement for stopping leaks, repairing castings, filling blow holes, etc., Stoving Blacks, Decorative Art Blacks Rosco Damp Resister for arresting damp in walls, Roscophalt coloured Bituminous Paints, Fillings for Iron, etc., etc.

An interesting booklet showing examples of ironwork treated with Rosphaltic and giving much desirable information will be gladly sent to any readers applying direct to Messrs. Rudd & Owen, Hull. We reproduce views of some of the numerous iron structures which have been protected by Rosphaltic solution.

SALT INDUSTRY IN KOREA

The *Osaka Mainichi* notes that the industry of salt refining at Chemulpo was counted among one of the most promising enterprises in Korea. At one time there were 31 salt refineries in Chemulpo, and the annual value of the salt produced there was estimated at between Y.700,000 and Y.800,000. The industry is one that can be conducted with a comparatively small capital, but even the Mitsui Bussan Kaisha directed attention to the industry, and refineries cropped up at Kunsan and other places. The anticipated success of these enterprises, however, has not been attained, although the process of refining salt in Korea is very simple. Crude salt is brought over from China by junk, and is dissolved in salt-water and then boiled. The salt so refined is whiter than the salt refined in Japan, and at first there was a large demand for the salt refined in Korea, but the quality is very poor. The Koreans found it unfit for use, and now the Chinese salt thus refined is used only in small quantities mixed with Korean salt. It has been found quite unsuitable for preserving fish, the brine being very poor. Of the 31 salt refining factories at Chemulpo, only one or two are still continuing operations, and there is no prospect of the recovery of the industry.

THE PUKOW SETTLEMENT

Mr. B. G. Tours, British Consul in Nanking, in his report on the trade of that port for 1912 says: No visible progress has been made in the matter of the development of the Pukow settlement at the southern terminus of the Tientsin-Pukow Railway, on the north bank of the Yangtze river, opposite Nanking. Much has been lost by the want of foresight of those responsible in not having had a settlement scheme ready to be put in hand as soon as the railway was sufficiently near completion. After the railway was completed a special commissioner was appointed to undertake the work of arranging for the establishment of a settlement at Pukow. He unfortunately died, and a successor was appointed; this gentleman commenced his work by proceeding to Tsingtao and Tsinan to study the settlements in those places, it being the idea of the Chinese authorities to make the Pukow settlement an example to the world of what China can now do in this direction, with her own brains and hands, and with her own money when she has any. The ambition is worthy enough, but preliminary difficulties of erecting a suitable and adequate settlement on ground which is 12ft. or more under water at the time of summer high water, and of financing the necessary municipal buildings,

wharves, lighting, water supply, godowns, etc., are not inconsiderable. The special commissioner is doing his best with the avalanches of advice which pour upon him, but it will be some time before any scheme is properly in train, and some years—probably five or six—before the settlement is in practicable shape.

In order to protect the valuable records of the U. S. Government from danger by fire Congress has made an appropriation for the installation of a modern system of auxiliary fire protection for three of the largest buildings occupied by the Department of the Interior in the city of Washington. A committee has been appointed to investigate the relative merits of systems adaptable to the buildings of the Department and to prepare plans and specifications. All communications regarding the subject should be addressed to the Chief Clerk of the Interior Department, Washington, D. C.

The *Engineer* hears that a steam turbine of 40,000 horse-power will be erected in the Hagen electric power station, Westphalia, Germany. This is said to be the largest turbine unit yet built. The present largest units are the two 30,000 horse-power turbines of the Rhine Westphalia Company, Düsseldorf, which were erected during 1912.

THE RELATION OF ELECTRICAL ENGINEERING TO OTHER PROFESSIONS.*

BY GANO DUNN

On the wall of a great engineering library is the legend "Engineering is the art of organizing and directing men, and of controlling the forces and materials of Nature for the benefit of the human race." This is broad and all-embracing, but other professions will find it hard successfully to quarrel with it. While the immediate object of engineering is a material one engineers draw from many different channels of human energy, such as generalship, commerce, psychology, mechanics, economics, to say nothing of chemistry and physics and many others, all under an interpretation, insight and method that are best described by the term scientific.

It may be asked: Why could not a similar statement of embrace or scope apply to medicine, the law, the army and other professions? In part it could, but it is to engineering that it applies preeminently. The subject matter of the older professions, the things about which they busy themselves, and the objects they seek to accomplish have changed relatively little in many centuries. The means have altered but the ends persist. They are approximately the same to-day as they have been throughout history and tradition. With engineering it is different. There was no such profession a hundred and fifty years ago, and if I may a little anticipate my conclusion, there will be no such profession a hundred and fifty years hence in respect to a large part of what we now call engineering.

Such as it is, engineering is embracing an evergrowing horizon, and is including more and more of the activities of civilization. When I say activities I refer to material ones and not to the whole of life itself. The human spirit is the greatest fact in the world, and art and literature that interpret it, the acts of our daily life and our personal relations that depend upon it, religion and the vast body of our social and political experience, that go to constitute life form undoubtedly a mass of activities, which are greater, in terms of consciousness, than the material activities which engineering can affect. In other words, the humanities which have been the same for ages can never be invaded by anything that merely rearranges our relations to the material world.

In the material world, however, which is at once the workshop and the throne, the glory and the limitation of the engineer, marvel has followed marvel and shall be followed by more marvels, for we are beginning to catch the tools' true play; beginning to see the vision of our dominion over the earth. Whether

truly is engineering to organize men, to predict the psychology of a fare-paying population, to win the endorsement of a labor union, to treble the yield of a farm by a microscope, all of which successes are called engineering, depends upon the definition that we finally adopt.

It is startling to study the variety and importance of the posts filled by engineers and to note the range of what they do. From the Efficiency Engineer presenting surprises in the output of a factory where the human factor is large, or the Industrial Engineer suddenly after thousands of years showing the world how to increase greatly the lay of bricks, or the Agricultural Engineer working miracles with the soil that for ages farmers have struggled with, to the Civil Engineer establishing a kingdom and building the Panama Canal, we have instances in which the engineer is doing more and more of the world's work.

The history of this class of men so rapidly growing in numbers, so rapidly differentiating in function is almost a romance. The Encyclopedia Britannica names the middle of the eighteenth century—that is, 1750—as the time before which there were only Military Engineers—who constructed "engines" of war—and it adds that at about that time there began to arise a new class. Little did this new class realize the army it was leading down the industrial paths of time!

The "new class" has surpassed all bounds. From insignificance a hundred and fifty years ago it has increased almost incredibly in numbers and variety of specialization. As a local indication, the Engineering Societies' Building in New York is the headquarters of fifty thousand engineers. As another local indication, the American Institute of Electrical Engineers has in the last ten years increased six fold. The growth in the variety of specialization has been almost as rapid as the increase in numbers. Where there were only Military Engineers and the "new class" a hundred and fifty years ago, there are twenty-seven recognized varieties to-day. Without mentioning all, they range from Civil through Mechanical, Electrical, Mining, Illuminating and Chemical, to Metallurgical, Refrigerating, Industrial, Agricultural and Aeronautical. There is even a magazine with the title Human Engineering.

A large and increasing part of the capacity of our Colleges and Universities is devoted to the education of engineers. Parts of the engineering curricula are borrowed for what used to be purely classical courses. The metaphors of the speech of the day often have an engineering basis and—we have a McAndrews hymn. The man in the street knows something about spark plugs, and many women understand the general principles of the telephone. The social status of the engineer has emerged

from that of a mechanic to one nearly as high as that of the clergyman, the physician or the lawyer.

Relatively recently there has been going on simultaneously with all this, however, hardly noticed, something else—a vast increase in so-called engineering work by men who are not engineers, and at the same time a large drawing off into executive, administrative, industrial, commercial, civic, educational, financial and even legal callings, of men of engineering training. A history of segregation and disintegration seems to have begun to accompany a history of integration and building up.

For one to say to-day he is an engineer gives very little idea of what he actually does. It does not locate him in one of the twenty-seven recognized classes. It leaves it possible for the hearer to think of him as a "social engineer" or an "efficiency engineer" should he not look like a "civil engineer," but even if he did define himself and say he was an electrical engineer, the hearer would still not know whether he represented the last word on the loading of telephone circuits or his responsibility was to determine whether the great railroad terminals of Chicago should use a third rail or an overhead catenary. If he should say "I am a teacher," "a physician," "a clergyman," "a lawyer," there would be a much more definite conception attaching to his answer. There must be, therefore, in the title "engineer" something broader, something not included, or included to a lesser degree, in the titles of the other professions or occupations.

A light is shed if we examine the popular definition that engineering is "educated common sense." Can it be that unlike "physician," "lawyer," "teacher," the term "engineer" does not describe what a man *does*, but rather *how* he does it! A method rather than an occupation! It is even so; that is essentially and with limitations I shall refer to later.

What then is this "method" that has given the engineer his ever broadening domain and brought all kinds of men and callings to his school? He can tell you at once. Here is where he is defined and where his fellows recognize him and each other though they come from the ends of the industrial earth as to diversity of actual occupation. The method had its birth in Greece, though it was stifled almost to death by the tremendous philosophic, humanistic and artistic energies of the Hellenes. Later it was buried in Europe under the irruption of the barbarians. The names of Thales, dear to our profession, with his "elektron," and of Aristotle and Archimedes, stand out as having done much for it—especially Archimedes in spite of the humanistically polarized

*An address presented at the 29th Annual Convention of the American Institute of Electrical Engineers, Boston, Mass.

intellectual atmosphere in which they lived and which they contributed so gloriously to create.

But the Greeks made only a start. To quote an authority, their material thinking was largely based on what has proved to be a wrong method of procedure, the introspective and conjectural rather than the inductive and experimental. They investigated Nature by studying their own minds, by considering the meanings of words rather than by studying things and recording phenomena. But they saw much of the light with all this. Though absolutely dead for a thousand years in Europe, "the method" was kept alive during the middle ages in Arabia, although confused with magic, alchemy and algebra. Then came Roger Bacon, Leonardo da Vinci and Copernicus, and science as we know it began to take shape.

Aristotle had sat down in his chamber and he wrote in a book, "A body twice as heavy as another of course falls twice as fast."

Galileo released simultaneously from the top of the Leaning Tower a one pound and a one hundred-pound shot and they reached the earth together, before the eyes of the assembled University of Pisa. But "the method" was repugnant to the University, and almost to a man they believed their Aristotle, sophistically explained away what they saw, and persecuted Galileo. Descartes, Newton, Lagrange, Laplace, Francis Bacon con-note to engineers the transcendent story, unless for electrical engineers there should be added Ampere, Faraday, Henry, Helmholtz, Kelvin.

The method of doing things that makes an engineer is, therefore, the applying to practical and utilitarian ends the principles and reasoning of science. Engineering is not science, for in science there is no place for the conception of utility. Truth is her sole criterion. In the exalted language of Professor Keyser, "Not in the ground of need, not in bent and painful toil but in the deep-centered play-instinct of the world Science has her origin and root; and her spirit, which is the spirit of genius in moments of elevation, is but a sublimated form of play, the austere and lofty analogue of the kitten playing with the entangled skein or of the eaglet sporting with the mountain winds."

Engineering is Science's handmaid following after her in honor and affection, but doing the practical chores of life, concerned with the useful and the material; with costs and with expediency and concerned with the humanities only in so far as they are an incident in some particular scheme of reality, and then objectively, if that may be said. Her methods merely apply "straight thinking to material problems for useful purposes."

Does this constitute a profession? No. Some day it will be the way almost everybody thinks instead of a body of specialists and then the difference between the doctor for instance and an engineer will be only in the things they busy themselves about; as is to-day the only difference between kinds of engineers. The center of education has been shifting rapidly recently—almost as rapidly as material well being has been increasing. The application of science to living has marked an age as distinct as the age of the climax of Art in Greece. The "new class" has been but a pioneer in sowing the seeds of scientific rationalization in a field the value of which was only dreamed of by Archimedes and not actually recognized until, as the Encyclopedia tells us, "about the middle of the eighteenth century," when the "new class" began to arise. And now, as to the limits which Engineering is a method rather than an occupation.

There will always be engineers, for the methods of Science will constantly advance, and there will be needed continually to interpret and transmit them to mankind and to make the first applications of them to useful purposes, a class of men who, by instinct and taste, as well as by the possession of what I later shall call the dynamic component, find easier than other men—and consequently perform better—the kind of scientific thinking, observation and action that characterize engineers to-day.

What these men will be busy about it is hardly safe to say, although it is probable the present great divisions of engineering will be more or less preserved. It seems certain that a large mass of knowledge that now is called engineering and forms the basis of many of the engineering specializations, will become general knowledge, and will be absorbed by the community, partly as a result of the shifting of the center of education and partly through everyday familiarity, and the men possessing this knowledge will no longer be called engineers. They will be called farmers, let us say, in the case of the "Agricultural Engineer"—of course, a farmer of a very advanced kind compared to the earlier one.

But the center of education will not always continue to shift. It is shifting now only because it has so long been eccentric. It would be a calamity for it to shift too far, resulting in a world whose sole training was applied science and the utilities. Under such a condition, engineering and the utilities themselves would languish instead of flourishing, for there would be lacking in engineers the dynamic component.

Ample knowledge, insight, information does not make an engineer. He must first be a man. Engineering is not thought like philosophy; it is thought times action, and only when the qualities of action are developed approximately to the same extent as the qualities of

thought is an engineer at his best. Only then is his area of effect a maximum. The qualities of action involve tastes and personality, the feelings, the will. And it is these that constitute the component or factor that makes an engineer's intellectual or rationalizing equipment dynamic—that puts it to use.

It was partly the intense appreciation of the value of the dynamic component that led the Greeks and successive centuries astray in the direction of their education and contributed to an underestimate of the importance of Science and the study of the laws of Nature. We must not go to the equally wrong other extreme.

So far I have said but little of electrical engineering. It must be brought in if for no other purpose than to justify our title. Although the article on "Engineering" in the Britannica occupies only six inches of one column, it concludes with the following: "The last great new branch is *electrical* engineering, which touches the older branches at so many points that it has been said that all engineers must be electricians." If engineering is a method of doing things, and electrical engineering tends to embrace all other branches, there is an implication that electrical engineering is the latest or most highly developed form of the method—the method that is the utilitarian application of the principles of Science to the material facts of life.

Such is unquestionably the case. Born scarcely more than twenty-five years ago, the "youngest branch," Electrical Engineering had the opportunity of striking its roots into the richest of scientific soils, free from prejudices, customs or traditions. It had no entangling alliances, no political laws to retard or encumber it. The field it preempted was the Terra Nova of Engineering, the New World of Applied Science.

Under the influence of those geniuses of science, Volta, Faraday, Ampere, Ohm, Kelvin, Helmholtz, Maxwell, Oersted, Henry, Gauss, and with the metric system for its cornerstone, there developed a comprehensive structure of thought and a related scheme of units. The latter are the admiration of the world for their simplicity, their convenience, their precision and their reproducibility. The scientific method as applying to all phenomena acquired its most perfect embodiment in the electric system and its relations.

But there is a philosophic debt that we electrical engineers owe our units. They school our minds. The ability to measure with precision difficult and complicated quantities enables clear thinking on them and renders reasoning about them possible that otherwise could not be attempted. To name a thing is to know it. The wonderful electrical units are a fluent language that gives the widest opportu-

(Continued on page 110.)

THE SUGAR INDUSTRY IN THE PHILIPPINE ISLANDS

By C. M. Conner, *Chief, Division of Agronomy.*

ORIGIN

It is not known just when sugar cane constituted one of the cultivated crops of the people living along the coast of South China or the Malay Peninsula, from whence it was undoubtedly introduced into the Philippine Islands. There is little doubt, however, but that it was first made use of in India, perhaps along the Ganges. As it is not now found in the wild state in any country it is impossible to even guess its original home. There are several grasses growing in the Philippine Islands and in tropical India that are closely related to the sugar cane, but variations in soil, temperature and rainfall cause such wonderful and comparatively rapid changes in all plants in the Tropics that it is impossible to say what a certain plant was like a few thousand years ago. The people who did first make use of it, perhaps found it growing wild in the jungle where it served as food for such animals as wild swine, elephants and other herbivorous animals. That swine fed upon it to a considerable extent would seem very plausible, and in rooting up the mature plants, the younger ones which escaped destruction were cultivated, as it were, and the field was left in good shape for another crop.

FIRST USE

Undoubtedly the cane was first used in chewing the stalk for the juice. Even at this time one will find sugar cane peeled and cut in small blocks and served at meals in Siam and parts of India. The juice was also extracted by crude methods and used as a fermented drink. Some one finally discovered that by boiling the juice it would become sweeter and would not ferment so rapidly. Geerligns says that fellow-travelers of Alexander the Great mention in their notes a reed growing in India which produced "honey" without bees. This "honey" was perhaps a thickened syrup made by boiling the juice until it made a thick sugary molass, called "gur" in India. Such syrup has been used by the natives in India since prehistoric times and is known in Sanskrit as "gud," which indicates a very ancient origin.

In order to make sugar it was only necessary for some one to accidentally boil down some of the juice to the point at which it would crystallize. This occurred about the seventh century in India.

Sugar-cane culture had reached the shores of the Mediterranean early in the Christian Era, and the Egyptians were among the first to make a kind of pure sugar by re-crystallizing. This did not happen, however, until several hundred years after the discovery of sugar.

INTRODUCTION INTO THE PHILIPPINES

The cultivation of sugar cane and the art of making sugar were undoubtedly introduced into the Philippine Islands by the Chinese. A description of the machinery and early methods used along the coast of China and Formosa reads very much like a description of early methods used in these Islands. Magellan, in 1521, found the sugar industry already established, although on a very small scale.

It is known that sugar making was first carried on in the Provinces of Pampanga and Batangas. The main reason why the industry flourished in these provinces only, in the early days, was that it was not safe to go into other sections with any large amount of property and as it requires a rather expensive equipment to grow and make sugar, the growers did not care to take the risk. However, as conditions improved, the industry began to spread to various other islands.

SUGAR SOILS

In these Islands there is no "typical" sugar soil. Sugar cane is grown on every kind of soil from light sand to heavy clay, the essential conditions being sufficient natural fertility, good drainage, and a retentive subsoil.

Much of the sugar cane in Pampanga is grown on a light sandy soil of rather low natural fertility. In Laguna and Batangas, the sugar soils are composed of a black, heavy, very retentive clay, except in the neighbourhood of Taal volcano, where more or less volcanic ash is mixed with the soil, making it rather light and easy to work as compared with the heavier soils near Lake Laguna. The majority of the soils are of rather high natural fertility. These black, sticky soils around Laguna grow very good cane. The Hawaiian varieties of cane grown at Alabang, Rizal, which is on Lake Laguna, seemed to make as vigorous a growth as did the same varieties at La Carlota, Occidental Negros; no fertilizers were used at either place. The sugar mill at Muntinlupa, mentioned elsewhere, makes sugar from cane grown on this type of soil.

In Occidental Negros most of the sugar soils are of volcanic origin and are of rather high natural fertility. Here and there are found many fertile spots which shade out to poor unproductive soils; there are large areas, however, which compare favorably with any of the sugar soils of the world. The average yield of sugar per hectare for the Province of Occidental Negros, as shown by statistics collected by the Bureau of Agriculture, is 2,295 kilos. This average is lowered by the great number of fields poorly managed and fields of low fertility planted to cane. Walker says: "I may state from personal observation that on a well managed plantation—and there are a few such in Negros—the yield per hectare under normal conditions of land actually planted in cane will rarely fall below 60 piculs (3.8 metric tons), and frequently comes nearer 70 piculs (4.4 metric tons); this should hold true in the poorer as well as the richer sections, as the difference in quality of soil is in a measure made up for by the fact that cane grown in the former is as a rule richer in sucrose and is replanted every year on fresh soil, whereas in the latter it is allowed to ratoon until the yield becomes greatly diminished."

COMMERCIAL FERTILIZERS

Commercial fertilizers are not used to any extent on sugar cane as yet in these Islands, but as more large mills are established and more intelligent methods of culture are put into practice, commercial fertilizers will find their proper place in cane culture. In most of the older cane-growing sections some sort of rotation is followed. In Pampanga and Tarlac other crops such as rice and corn are planted on the land after the cane crop. In Negros it is the custom to allow the fields to lie idle for one year after the last ratoon crop is taken off and pasture the work stock on this land during the season. Both of these methods have their faults. While in the first they secure some returns from the lands, such returns are not as great as they would have been had the land been in cane; neither was the soil improved for the next crop of cane. In Negros nothing is gained in the way of a crop except pasture for the work stock, but the land is slightly improved on account of the increase in humus or organic matter left in the soil by the crop of grass. It would be infinitely better if the fields were planted in cowpeas or velvet beans and the crop either harvested for hay or pastured off with cattle. In either case nitrogen should be added to the soil to produce two or three good crops of sugar cane.

In making use of commercial fertilizers, it will be necessary to make a study of the soil. Different haciendas may require fertilizers of different compositions and much experimenting will be necessary before a formula is decided upon for any one locality.

Fertilizers do not improve the quality of sugar, as many people believe, but on the contrary tend to produce a juice having more impurities than that from cane grown on poor soil. This fact, however, need not discourage the use of fertilizers as these impurities are easily removed by the modern mill. It should be borne in mind, however, that unless there is a uniform supply of water for the crop, either by rainfall or irrigation, much of the expected increase from the use of fertilizers will be lost.

VARIETIES

New varieties of sugar cane are not easily produced, hence the number of varieties found in these Islands, prior to the organization of the Bureau of Agriculture, was very limited.

New varieties are produced in two ways, first by growing your seedlings, which by the way is very difficult, and by bud-sports from some established variety. Many new varieties have been tested out during the last twenty years, but only a few have met the requirements of the planters.

Walker says that "The native cane ordinarily grown in Negros is, in respect to the richness and purity of its juice, equal to that of almost any other sugar-producing country in the world, and, having in addition a comparatively low fiber content, could hardly be improved upon in its adaptability to a thorough and economical extraction by milling." Some new varieties introduced from Hawaii, in 1910, were grown at Alabang, Rizal Province, and La Carlota, Occidental Negros. A test was made of these by the Bureau of Science, and the results are given below together with the variety mentioned by Walker (referred to above) which is shown in the last line, second section of the table.

Analysis of varieties of sugar cane.

Names of varieties.	Juice. Per ct.	Polariza- tion. Per ct.	Brix.	Purity of coefficient.
H-16	75.8	14.3	16.3	87.8
H-20	90.3	18.3	19.3	94.9
H-27	77.3	17.0	17.9	95.0
H-69	81.8	12.9	15.0	86.0
H-227	78.3	14.1	15.9	88.8
H-309	93.2	14.9	17.1	87.6
Native cane	78.8	19.9	20.7	96.5
Negros cane	89.9	18.4	20.3	90.3

Hawaiian varieties of sugar cane grown at Alabang.

Harvested December 20, 1911.

The six Hawaiian varieties mentioned above were planted at Alabang in December, 1910. On December 10, 1911, another field was planted to these same varieties. On November 11, 1912, both these fields were in full arrow. There seems to be something in the climate which makes these varieties mature much earlier than they do in Hawaii.

The larger growing varieties, common to Hawaii and other cane-growing countries, have not met with popular favor among the small planters, first for the reason that the stalks were too big for small mills to handle and second because the larger varieties would not respond properly under the native methods of handling. The native cane is planted in rows varying from one-half meter to 1 meter apart, depending upon the locality. Cane so planted soon covers the ground and checks the growth of weeds and grass but does not produce the greatest amount of sugar per hectare. It is true that the smaller native varieties may be planted closer than the larger foreign varieties, but the general tendency heretofore has been to plant too close. Some of the more progressive farmers in Laguna and Pampanga are planting the native cane in rows 1 meter to 1½ meters apart; for the larger foreign varieties, the distance is increased 50 per cent.

On the San José Estate at Mangarin, Mindoro, where 5,000 hectares of new land are being planted to cane, the native varieties are plant

in rows $1\frac{1}{4}$ to $1\frac{3}{4}$ meters apart and the tendency has been to increase rather than to decrease the distance.

It should be understood that these distances are possible only where the cane is given the best possible culture and attention.

The division of agronomy of the Bureau of Agriculture has the following varieties of sugar cane under observation:

Common Negros purple,
Inalmon, Negros dark purple,
Yellow Caledonia,
Rose bamboo,
Striped Louisiana,
Lahaina,
H-16,
H-20,
H-27,
H-227,
H-309.

A limited number of stalks of these, for seed purposes, may be had free of charge. Large quantities, when available, will be sold at the rate of P.10 per ton, parties desiring the cane to pay cost of cutting and of transportation to shipping point.

EXTRACTION OF JUICE

The juice of sugar cane was first extracted by pounding short pieces of cane in a mortar. A small outlet was left at the bottom and the juice allowed to run out into a jar.

The first mills consisted of two wooden rollers set in an upright position and turned by animal power. This was followed by stone rollers cut out of granite at a very great cost of time and patience. The steel rollers are of rather modern origin.

Naturally a large per cent. of the actual sugar was lost on account of faulty methods of extracting the juice, and only a low grade of sugar was made owing to the methods followed in boiling. These ancient methods, with only slight improvements, have continued down nearly to this date. A new era, however, is dawning for the sugar industry, as modern mills are being installed and sugar of the highest quality is being produced.

CENTRALS

At the present time there is one large central in operation. This mill has 11 rollers and is capable of grinding 1,200 tons of cane in twenty-four hours. It is located at Mangarin, Mindoro, and is owned by the Mindoro Company. Two mills of like character will be ready to begin operations in the near future. One, owned by the Calamba Estate near Calamba, Laguna, will be ready to begin operations in 1914, and another, at San Carlos, Occidental Negros, owned by the San Carlos Milling Company, will be ready to begin operations in 1915.

There are also in operation three smaller mills, with a capacity of 125 tons of cane in twenty-four hours, located in various parts of the Islands. One, owned by Macondray & Company, is at Muntinlupa, Rizal Province; another, owned by the Roxas Estate, is located near Nasugbu, Batangas, and the other, owned by S. Urquijo, is near La Carlota, Occidental Negros.

Several other small mills are in project.

As soon as these mills get well underway and the people see that there is more money in selling the cane to the large mills than there is in manufacturing a low grade of sugar, other mills will go up as fast as money can be found to finance them.

ACCORDING to the American Consul-General at Moscow, the production of copper in Russia has greatly increased in the last few years. In 1906 the production was 10,000 tons, and was not equal to one-half the requirements of the country. This increased to about 30,000 tons in 1912. At present all domestic requirements of electrolytic copper are met with metal of Russian origin.

THE RELATION OF ELECTRICAL ENGINEERING TO OTHER PROFESSIONS.

(Continued from page 108)

nity to thought. By their character they educate our faculties of definition and of relation. They typify all quantitative thinking, not merely electrical. They are, indeed, the epitome, the last word of the great minds of our age, as to what the scientific method of thought is.

Therefore although the subject matter of electrical engineering is covering a wider and wider range—so wide as to be almost incongruous, the electrical method of thinking is applicable throughout it and it is, in fact, spreading far beyond. As an electrical engineer, I even find myself thinking of the crowds passing in the streets in terms of amperes and volts, and of the fluctuations of the stock market in terms of current, inductance, capacity, resistance and resonance.

That which can impose form upon our thought enables us successfully to think of any kind of thing. The forms of thought established for electrical engineering are at once so comprehensive, so rigid, so rich in detail, and so illuminating that engineering does not bound them. They may be called the manifestation of Science in civilization, the best representation of the scientific method at work for utilitarian ends. They prove that the profession of Electrical Engineering not only deals with single-phase motors, storage batteries, high-tension transmissions, turbo generators, coronas, carbon transmitters and commutation, as an occupation, but that it also is a way of thinking, and as such is not an occupation, but the latest and most highly developed scientific method of solving all kinds of practical problems of matter and force, for the benefit of the human race.

IMPERIAL JAPANESE IRON FOUNDRY.

The *Jiji* quotes General Nakamura, Director of the Imperial Iron Foundry, Japan, as follows on the working of the foundry:—The foundry is now in course of extension. In carrying out the administrative reforms just effected, part of this work of extension has been carried forward, the staff has been reduced, and expenditure curtailed, but not in a way to interfere with the operation of the concern. As a result of the first stage of the extension of the foundry, made in 1909, new machinery was added. Over 160,000 tons of iron and steel were produced in 1910, over 180,000 tons in 1911, and 250,000 tons last year. It therefore follows that the net profit of the foundry has also increased. The profit amounted to Y.50,000 for 1911, increased to over Y.150,000 for last year, and is estimated to increase to Y.4,000,000 this year. This increased profit is partly due to the activity of the iron market at home and abroad, and partly to the improved skill of the operatives and the perfection of the machinery and plant. The output of iron and steel this year cannot be ascertained as yet, but is estimated at no less than 200,000 tons, so the net profit is estimated at about Y.4,000,000.

AUTOMOBILE TRAFFIC BETWEEN KULUN AND KIAKTA

The following is from the *China Tribune* (Tientsin):—At a conference recently held at Moscow to discuss the question of operating automobiles between Russia and Mongolia, the report of an investigating committee consisting of Mr. Ressenikoff, Chairman of the Trade Association, Dr. Popofe, Mr. Gorkin, a wealthy merchant of Kiakta, Engineer, etc., was read concerning the plan to open automobile traffic between Manchouli and Kulun. The scheme was based on the result of investigation made by the Russian Frontier Garrison. The distance measured 800 versts of nearly level ground, except a section of sandy soil for over fifty versts. More than twenty days are required for a camel or cattle to cover it, but only two days will be required by an automobile. The report pointed out the advantage of attracting railway traffic if the route is opened, while establishing Russian influence in the region rich in natural resources and having important military relations.

The plan, however, was opposed by many. The reason briefly stated amounted to this. By the Manchouli-Lulun Route, Russian merchandise will be sent eastward first and then turned back to the western direction. The detour making the distance unnecessarily great, Russia will receive no benefit. Besides, they did not desire to have Manchouli, that is remaining as the source of many disputes between China and Russia owing to its proximity to China's border, as the starting point of the route. The meeting finally approved a proposition to run automobiles between Kulun, Kiakta and Welfnevijsk, so that connection with the Siberian Railway can be established.

The passage selected by the Conference being in a fairly good condition, there are persons who are even now individually running automobiles on it. The distance between Kulun and Kiakta measures 250 versts and that between Kiakta and Welfnevijsk is something like 550 versts. Since Russian goods exported to Mongolia by the Siberian line are shipped under special reduced rate as far as Welfnevijsk Station, which was carried in effect on May 1st, the proposed scheme, when put in operation, will prove to be very advantageous toward developing the Russo-Mongolian trade. The meeting is said to have submitted the plan to the Russian authorities, the Mongolian Government and local merchants.

PUBLIC WORKS AT ZAMBOANGA

During the present year, says the *Manila Times*, the thriving city of Zamboanga will spend the sum of P.400,000 for needed public improvements, an arrangement having been completed with the insular government for a loan of P.320,000 of the amount, and P.80,000 being appropriated by municipal and provincial governments.

The greater part of this sum will go into port works, for which plans are now being perfected by the port works division of the bureau of navigation, under the supervision of Assistant director Heck and Provincial engineer Stirling, who is now in the city with plans prepared by him independently of the bureau. As the construction and designing of the port works comes under the supervision of the bureau, his plans are being rearranged to meet the approval of Director Helm.

Plans and specifications for the waterworks plant, also included in the P.400,000 expenditure, were completed some time ago, and the province is now advertising for bids for its construction. The city is at present inadequately supplied with pure water, and plans have been on foot for years to replace the antiquated system now in use with a modern plant.

As soon as completed, bids will be requested for the port works construction.

THE PYLE-NATIONAL LOCOMOTIVE HEADLIGHT

The Pyle-National Locomotive Turbine Generator and Electric Headlight Equipment, shown here, is the development of eighteen years' exhaustive experimenting by the most capable talent and the best equipped factory for the manufacture of Electric Headlight Equipment in the United States, consequently enabling them to insure the highest class workmanship and absolute uniformity and interchangeability of parts.

The turbine is of most simple construction and is composed of but few parts which are extremely strong. The casing is constructed of one casting and has a barrel extension for connecting to the generator and also for supporting the generator bearing, assuring perfect alignment and easy running. There are two steam inlets which are situated near the top of the casing and at opposite sides of the valve chamber so that the steam may be piped to the turbine as is most convenient and with the shortest possible pipe. The steam ports are made short and of small area, thus reducing the condensation to a minimum and are so designed that all water drains through the turbine, making it impossible to freeze and burst. The exhaust opening, which is of 2" pipe diameter, is at the top and at the left side of the casing and in alignment with the buckets, providing a free unobstructed passage of the steam to the atmosphere. A drain pipe is provided to carry off any water of condensation.

The rotor or wheel is made of cast steel and perfectly balanced and is held on the shaft by means of a taper fit and a lock nut which bears against the hub. The wheel contains but one row of buckets which are made from a drawn sheet metal. The buckets are dove-tailed into the side of the rotor and welded substantially together, making the completed rotor as strong as though the buckets and rotor were integral.

The buckets are formed symmetrically with round corners to accelerate the flow of steam. They are designed to travel at a velocity of 185 feet per second. The steam is delivered to the buckets three times, first from an initial expanding nozzle which increases the velocity of the steam from approximately 1,450 feet per second, at which velocity it enters the nozzle throat to nearly 3,000 feet per second, at which velocity it is delivered to the buckets from their inner side in an outward radial direction. After passing through the buckets it is taken up by a guide passage and again delivered to the buckets from the outer side in an inward radial direction. After passing through the buckets the steam is again taken up by another guide passage and is delivered to the buckets in an outward radial direction. Each time that the steam passes through the buckets, a certain amount of velocity is abstracted so that the velocity is greatly reduced after its third passage, after which it passes directly to the exhaust opening.

By having the nozzle and second guide passage situated at the top and on the inside of the row of buckets, the steam aids in the suspension of the rotating parts, thereby reducing the friction and wear on bearings and shaft to a minimum.

The governor is of an improved centrifugal type, having a tension coil spring, which is screwed into a yoke. This in turn is held to the

rotor by two adjusting screws. The opposite end is fastened to a sleeve secured into it. This sleeve is made from a close grained cast iron, into which is fitted a brass bushing. The purpose of this bushing is to avoid corrosion and sticking of the sleeve to the shaft upon which it slides. At one end of the sleeve there is a flange, having a smooth surface against which a composition ring bears and transmits the re-

speed within 3%. The governor valve is of simple conical poppet type, mounted in a taper cage, having ports which register with corresponding ports in the turbine casing. The valve controls the flow of steam to the nozzle by throttling, the motion being imparted to the valve from the governor. A retaining nut forming the valve seat holds the valve cage in place. For adjustment of the valve to compensate for

any wear that has taken place, the valve cage is withdrawn from the casing. This is done by removing a screw cap which closes the opening for receiving the valve cage, unscrewing the retaining nut valve seat and inserting a 5/8" machine bolt in the threaded upper end of valve cage and withdrawing valve cage and valve. The adjustment is then made by the adjusting nuts on the valve stem, screwing these to the left shortens the valve travel and takes up any wear that may have taken place.

The shaft is made from a very high carbon steel and ground absolutely true, supported by a composition sleeve bearing, mounted in the turbine cover with oil cellar and ring. The generator end is supported by a ball bearing which does not allow the armature to come in contact with the pole pieces from

reciprocating motion from the rotating sleeve to a yoke lever mounted in the casing. The yoke lever in turn imparts the motion to an intermediate lever which rests against the adjusting nut on the valve stem, thus automatically adjusting the valve to the load or steam pressure and maintaining a fixed speed.

wear.

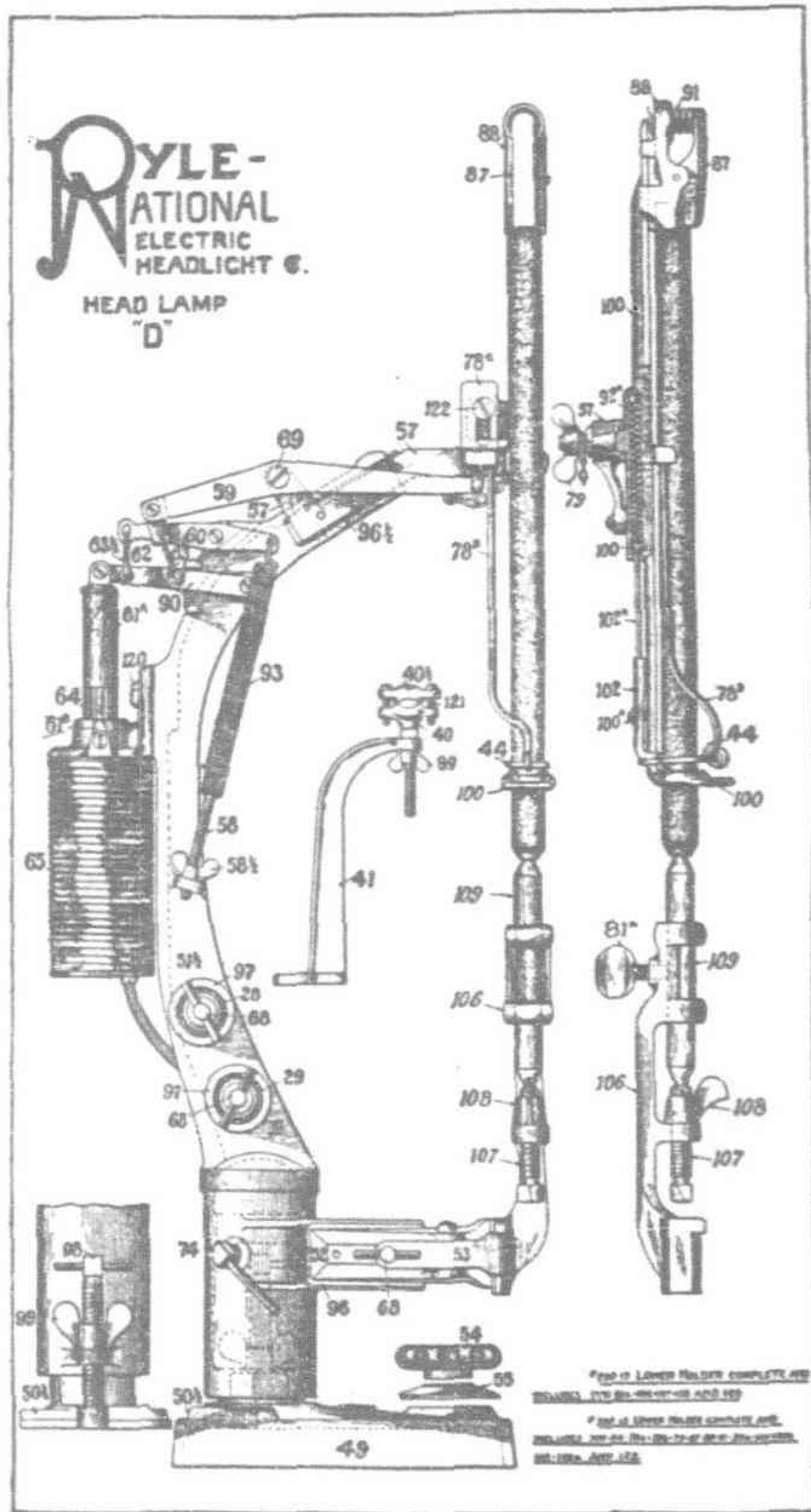
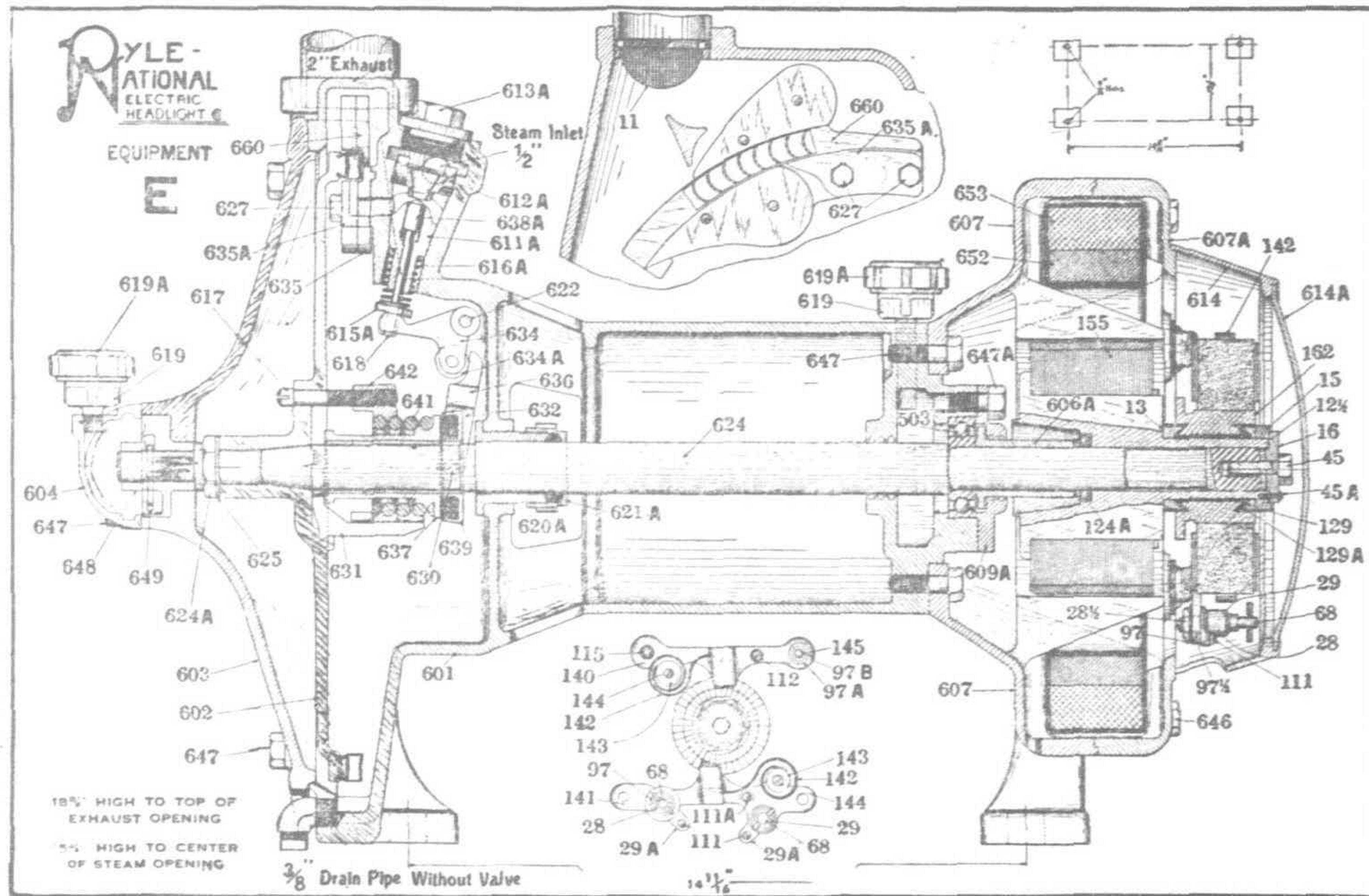
The generator is of the bi-polar, internal magnetized type. The pole pieces are integral with casing. The field windings are compound. The shunt and series coils are insulated separately and taped together. The windings are generously proportioned and will carry momentarily 100% overload without injury.

The armature is of the slotted ring type.

The brushes are held in contact with the commutator by a spiral spring with a fixed tension, requiring no adjustment. The generator for locomotive use is wound for 32 volts and will develop 1,500 watts at its maximum speed of 2,800 R. P. M.

CANADIAN PACIFIC RAILWAY

A telegram from the secretary of the Canadian Pacific Railway Company at Montreal states that the gross earnings from railway and steamship lines for the year ended June 30 amounted to \$139,395,699, against \$123,319,541, while the working expenses absorbed \$93,149,825, against \$80,021,298, making the net earnings \$46,245,874, against \$43,295,243. To this has to be added net earnings of steamships in excess of the amount included in the monthly reports (\$1,245,563), making a total net income of \$47,491,437, against \$44,402,692. After deducting fixed charges there is a surplus of \$36,615,085, against \$33,877,754. The sum of \$1,000,000 is again transferred to steamship replacement account, and \$125,000 is again contributed to the pension fund, the net revenue from railway and steamship lines available for dividends being \$35,490,085, against \$32,752,754. After payment of all dividends declared for the year the surplus from railway and steamship lines for the year carried forward is \$18,310,257, against \$17,560,519. The special income from the interest on land sales and from other extraneous assets not included in the above was \$6,598,151, against \$5,158,585. A dividend of 2½ per cent. for the quarter ended June 30 has been declared.



The Governor weights are of "L" form made from drop forgings and rock upon knife edges in sockets on the rotor. The shorter leg of the weight is forked to straddle the shaft and rests against the end of the governor sleeve, the whole making a very sensitive governing mechanism, which controls the rotative

FAR EASTERN RAILWAYS

CHINA

Yunnan Railways.—Reuter's Peking correspondent reported on August 19 that an offer had been made to the Governor of Yunnan by Messrs. Carlowitz through their Hongkong manager, who is also a director of the Hongkong and Shanghai Bank. Messrs. Carlowitz offer £3,000,000 for the construction of a railway from Yunnanfu Eastwards to Peso on West River (? Poseli in Kiangsi). Messrs. Carlowitz offer to furnish both railway material and to finance the undertaking at interest of 5½ per cent. Carlowitz, who represent Krupp's to have for a period of twenty years a monopoly of all Government contracts for the supply of arms and ammunition and all mining and other machinery, and an extensive series of mining concessions along the course of the proposed railway.

Canton-Hankow Railway.—In his report on the trade of Hankow for 1912, Mr. F. A. Carl, Commissioner of Customs, writes, in part, as follows:—

I am indebted to Mr. A. H. Collinson, engineer-in-chief of the Canton-Hankow Railway, for the following interesting remarks on railway work in the Hupeh-Hunan section:—“Survey work was resumed in June last, since when the whole route of the railway has been resurveyed from Wuchang to Yochow, a much better alignment has been obtained, and a saving in length made of slightly more than 11 miles compared with the original survey. The distance by the new route from the zero (which is some 2 miles to the north of Wuchang) to Yochow is 142 miles. The difference in level between the Customs low-water zeroes at Hankow and Yochow is 17.50 feet. The line as finally laid down will pass some 3 miles to the east of Chengling, it having been decided that the traffic prospects at this port do not justify a costly deviation, which would be necessary to bring the railway nearer the town. Access to the river will be obtained by a short branch near the North Gate at Yochow. Between Yochow and Changsha it has also been decided to make a new survey, and three parties are at present engaged on this work, and, from what can be gathered from their preliminary survey, a further saving in length of some 14 miles will be obtained. The policy of keeping inland away from the river, is being followed, and the original somewhat lengthy deviation to Siangyin has been abandoned. The probable distance by the new route from Yochow to Changsha will be about 82 miles, or 225 miles from Wuchang. The difference in levels of the Customs zeroes at Yochow and Changsha is 30.13 feet, making a total rise from Wuchang of 47.63 feet. From Changsha to Chuchow, a distance of 30 miles, a railway has been constructed by a provincial company, which will eventually be merged in the main line to Canton—negotiations for its transfer are still proceeding. Some hundreds of miles of reconnaissance survey have been made from Chuchow to Hengchowfu, and south to Ichanghsien, on the borders of Kwangtung, the country between the latter cities being mountainous and difficult for railway construction. The line has not yet been definitely located beyond Chuchow, but sufficient information has been obtained to estimate approximately the distance by rail from Wuchang to Canton, which will probably not exceed 700 miles. At the present time the engineering staff are busily engaged in completing the survey work, and everything is in readiness to commence construction on the section from Wuchang to Yochow at an early date. The engineers report having met with nothing but friendliness and civility from the officials and country-people throughout, and that everyone seems anxious for the construction work to commence.

Traffic prospects are also reported to be very good; the line will pass through the tea districts at Yanglowsze and Yanglowtung, while the country south to Changsha and beyond is highly cultivated and prosperous; the railway will tap very rich mineral districts in Hunan, and will no doubt become a great factor in the development of this profitable industry.”

SHANGHAI-NANKING RAILWAY

The following figures of traffic returns (approximately) for the week ended July 19 are issued by the Shanghai-Nanking Railway:—

Year.	Passengers.	Goods and Sundries.	Total for the week.
	\$	\$	\$
1913....	54,840	10,955	65,795
1912....	34,611	8,364	42,975
Increase.	20,229	2,591	22,820
Decrease	—	—	—

For twenty-eight weeks.

Year.	Passengers.	Goods and Sundries.	Total
	\$	\$	\$
1913....	1,373,260	305,763	1,679,023
1912....	1,320,750	196,046	1,516,796
Increase.	52,510	109,717	162,227
Decrease	—	—	—

Week ended July 26.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	\$	\$	\$
1913....	41,066	8,494	49,560
1912....	33,955	8,493	42,448
Increase.	7,111	1	7,112
Decrease	—	—	—

For twenty-nine weeks.

Year.	Passengers.	Goods and Sundries.	Total
	\$	\$	\$
1913....	1,414,326	314,257	1,728,583
1912....	1,354,705	204,539	1,559,244
Increase	59,621	109,718	169,339
Decrease	—	—	—

[The train service was suspended between Changchow and Nanking on July 22. The night train was cancelled on July 23.]

Week ended August 2.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	\$	\$	\$
1913....	28,087	5,014	33,101
1912....	32,111	9,058	41,169
Increase.	—	—	—
Decrease	4,024	4,044	8,068

For thirty weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	\$	\$	\$
1913....	1,442,413	319,271	1,761,684
1912....	1,386,816	213,597	1,600,413
Increase.	55,597	105,674	161,271
Decrease	—	—	—

[The western portion of the line was closed on account of the rebellion and trains were run on an average of 121 miles open.]

Week ended August 9.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	\$	\$	\$
1913....	23,884	5,598	29,482
1912....	33,718	9,348	43,066
Increase.	—	—	—
Decrease	9,834	3,750	13,584

For thirty-one weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	\$	\$	\$
1913....	1,466,297	324,869	1,791,166
1912....	1,420,534	222,945	1,643,479
Increase.	45,763	101,924	347,687
Decrease	—	—	—

[Woosung Line traffic closed down entirely from August 3. Main Line: No train running beyond Tanyang this week.]

Wuhu Railway Schemes.—The British Consul at Wuhu, in his report on the trade of that district for 1912, writes:—

The Tientsin-Pukow Railway runs through the north-east of the province.

The railway schemes in the air are:—

(1) Hsin Yang-chou, on the Peking-Hankow line to Pukow, the terminus of the Tientsin-Pukow line. The concession, dating from 1898, is in the hands of the British and Chinese Corporation. Arrangements have been made for the survey, and the line will doubtless be built in due time.

(2) Wuhu to Kuangte and Hangchow. The scheme was first mentioned in the trade report for 1905. The company which undertook the construction was purely Chinese and unofficial. The result has been some earthworks for a dozen miles or more, one or two wooden bridges and 100 yards of line laid.

(3) Wuhu to Nanking. This scheme was mentioned in the trade report for 1907.

(4) Hsinyang, on the Hankow line, to near Peng-pu on the Pukow line via Shouchou and the valley of the Huai River.

(5) Anking to Shouchou.

The last four are Chinese and will remain ideas on paper without any chance of being completed so long as they are in Chinese hands.

A Consular report from the Chinkiang district of China says:—The traffic to and from Chinkiang station by the Shanghai-Nanking Railway continues to increase, and does not yet seem by any means to have reached its limit of expansion. The arrangement by which goods covered by transit pass are allowed to be carried by rail, an arrangement which has been desired for some years, and only brought about in 1912, has affected the railway returns most favourably.

The Kiangpei Railway scheme has formed a topic for much discussion during the year; but for all practical purposes it might as well have not been agitated, for no progress towards definite action has been made. There have been abortive attempts to raise loans for the purpose, but a feeling is beginning to grow up that, so far as Chinkiang is concerned, the improvement of the canal is of primary, and railway of secondary, importance.

Changsha-Chuchou Line.—Mr. Consul Bertram Giles, British Consul at Changsha, writes in the course of his annual report:—

The bridges on the Changsha-Chuchou line were completed during the year under review, many of them having hitherto been merely temporary trestle bridges. Traffic was carried on without interruption, two trains having been running each way since January, 1912. So far but little goods traffic has been attracted, carriage on the adjacent waterway—the Siang River—being so much cheaper. A certain quantity of coal has, however, been carried from P'inghsiang to Changsha—not the coal of the P'inghsiang collieries, but of smaller mines worked by private companies. A European firm obtained a 200,000 tael order (about £30,000) for additional rolling stock, and a British firm a large order for tools and steel.

A further section from Chuchou to Luk'ou, about 30 li (10 miles) in length, was commenced at the end of September, and towards the middle of December about nine-tenths of the earthworks and one-half of the bridge and culvert work reported completed. Two European firms obtained the order for the rails. This section will probably be opened to traffic some time in 1913.

Down to the end of September the capital expenditure on the line, only 33 miles in length, amounted to close on Tls. 6,500,000 (about £660,000). This was stated by the chairman of the railway at a meeting of shareholders held early in October. When the cost of the

paid, was resumed last summer, and has hitherto been devoted to work on the Chuchou-Luk'ou section. When the Hankow-Canton trunk line has been nationalised this levy, supplemented by the purchase price paid by the Central Government for the section already built, and possibly also by a foreign loan, is to be devoted to the construction of branch lines. A number of proposals for such branch lines have already been put forward, but in no single case do the financial and other practical aspects of the question appear to have been given a moment's consideration. It is stated that a start will be made with a railway line from Changsha to Changteh and on to Ch'en Chou-fu. Even this line, however, has little chance of being completed at all, much less at a cost which will enable it to cover its working expenses, unless the shareholders will consent to both the construction and the expenditure being placed under foreign supervision.

Railways in Shantung.—The details of the amalgamation of the Shantung Mining Co. and the Shantung Railway have now been ascertained. The stockholders of the railway, in session at Berlin, voted to pay \$1,285,000 in railway shares to the shareholders of the mines. It is reported that the main offices will be removed from Germany to Tsingtau. The railway runs from the port of Tsingtau west to Tsinanfu, where it connects with the north and south Tientsin-Pukow Railway. The Shantung Railway carried 908,000 passengers and 705,074

Seidaiji Light Railway Company to connect Seidaiji with Kubata in Kamimichi district, Okayama prefecture.

Chosu Railway Company to connect Fukagawa with Nishi in Otsu district, Yamaguchi prefecture.

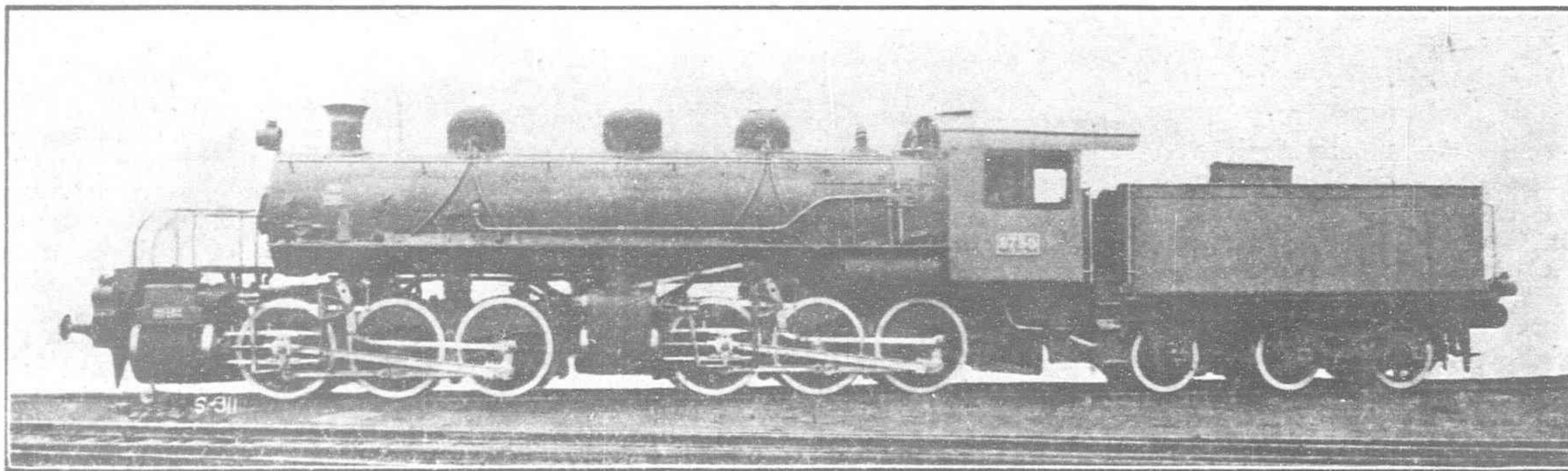
Koya Tozan Railway Company to connect Tsumori Nishinari district, Osaka-fu, with Kizu Kirashima-cho, Minami ward, Osaka city.

Koya Tozan Railway Company to connect Hashimoto with Sumida in Itsu district, Wakayama prefecture.

Awa Electric Light Railway Company to connect Horie with Itanishi in Itano district, Tokushima prefecture.

THE PHILIPPINES

The Manila Railway.—The proprietors of the Manila Railway Company (1906), (Limited), which company owns the securities of the Manila Railroad Company, were to meet on July 24 to receive the report and accounts for the year 1912, and the debenture-holders to consider a proposal to extend the present authorized issues of "A" Debentures and "B" Debentures by £500,000 each. It is necessary to an understanding of this proposal, and of the future of the railway property which the British company indirectly owns, to realize that the railway is still to a large extent in course of construction. Although it is 25 years since the old British company came into existence to



Mallet type locomotive constructed by the American Locomotive Company for the Imperial Government Railways of Japan

Chuchou-Luk'ou section, since incurred, is taken into consideration, it will be seen that the total expenditure cannot fall far short of Tls. 7,000,000 (about £1,000,000) for a railway 43 miles in length, of which only 33 miles are completed. When, in addition, it is remembered that the line is very badly laid, that much of the rolling-stock is inferior, and that the receipts are exceedingly small, it will hardly seem surprising that the shareholders should have acquiesced in the policy of nationalisation. On the other hand, they want the whole of the money squandered on a short section of ill-constructed line refunded before they will stop work or hand over the line to the Central Government.

In the meantime the rough survey of the line by British engineers, which was interrupted in 1911 by the outbreak of the revolution, has been completed, and a more detailed survey from the Hupei border to Yochow and thence direct to Changsha, avoiding Siangyin, which it was originally intended to touch, is being carried out, and the actual work of construction is, I understand, to be taken in hand in May, 1913.

The Chuchou-P'inghsiang line is now being reorganised with a view to the regular carriage of passengers and general merchandise, as well as coal. The permanent way is being repaired and strengthened, the old rolling-stock is being patched up, and an order for an additional locomotive and three passenger coaches has been placed in Germany.

The additional levy in aid of railway construction, based on the amount of land tax

tons of freight in 1911, while the mining company had an output of 459,175 tons of coal.

The long-discussed projects of the Kaumi-Ichoufu railroads and of a steel plant for Tsingtau have been revived. Careful surveys of the commercial possibilities of the territory through which the railroad would pass were made by the German officials toward the close of 1912. The railroad manager in Tsingtau considers the present situation in Europe the chief obstacle to progress on either of these projects. He also states that in his opinion the taxes which would be levied on a steel plant built on Chinese territory will make it necessary to build in Kiaochow, and it is understood that the selection of a site has been discussed with the local government.

JAPAN

New Light Railways.—The Japanese Railway Board has granted charters for the construction of light railways to the following railway companies:—

Higashino Railway Company to connect Nishi Nanuno, Nasu district, Tochigi prefecture, with Taishi, Kuji district, Ibaraki prefecture, and also Kawanishi, Nasu district, Tochigi prefecture, with Karasuyama in the same district.

Asama Tozan Railway Company to connect Asama with Fujimi Pass in Yogo village, Watarai district, Miye prefecture.

take over a concession from the Spanish Government for the construction of a line some 122 miles in length, the present development of the property may be thus summarized; out of a projected 820 miles of road, 479 miles are in operation and 341 miles are yet to be constructed, according to the programme which, under the terms of a concession granted by the Philippine Government, must be completed by the end of 1918. In the three years 1910-1912 183 miles of new road were opened to traffic, and the large proportion which that bears to the total length of line under operation at the end of 1912, nearly two-fifths, is strongly suggestive both of the progressive policy to which those who control the property have committed themselves and, in the light of the development of earnings, of the real progress which the railway has made, for the average net earnings per mile on the 283 miles of 1909 were £405, while on the 466 miles of 1912 they were £485, an improvement of nearly 20 per cent.

The large construction works in hand make the raising of further capital a necessity. Nevertheless it is not the intention of the board to make any further issue of bonds. The bonds which the security-holders are asked to authorize can be used as collateral security for temporary financing, and it is not an unreasonable supposition that as time goes on an improvement in the company's general credit and a fall in prevailing rates of interest will combine to raise the market price of the "A" and "B" Debentures and thus enable the board to issue, on more favourable terms than could be commanded at present, such amounts as

seem desirable to add as a permanent charge on the undertaking. The argument that the board would have been better advised to seek an extension of the share capital in the form of Pre-Preference shares—which has been suggested—will be immediately dismissed, we venture to say, by any person who studies the accounts and is acquainted with the common conditions of construction financing, rendered especially stringent as they are to-day.

It is true that the company's property will appear somewhat overweighted with bonded indebtedness if and when the new Debentures are issued publicly, but before that necessity arises it is possible that an increase of the share capital on favourable terms will have been made practicable by the improvement in earning power, in which case the company can then take advantage of that state of affairs and complete a financial operation which will be much more economical and much more sound than any attempt to finance the present requirements by the issue of privileged share, which, if we mistake not, could only be done on distinctly extravagant terms. Debenture-holders who are disposed to object to the extension of what is in effect a "closed mortgage" on the ground that their proportionate security will not appreciate as it would if junior securities were created may have something to say on strictly logical premises but the question of the good of the whole company on broad grounds is more important. What best facilitates the completion of the construction programme will greatly improve the proportionate security for the Debentures, and bondholders are often well-advised to look somewhat further than the mere question of the enforcement of their security. The scheme is approved by the Merchants Trust (Limited), who are trustees for both classes of bondholders.

Since the Manila Railway Company derives all revenue from its investments in the Manila Railroad Company of New Jersey, it is to the accounts of the latter, the operating Company, that we must turn in order to mark the progress of the property, and a comparison between the operating revenue results of the past two years is of some interest in this regard:—

	1911.	1912.
Miles of road open end of year.....	426	466
	£	£
Gross Operating Revenue.....	355,604	436,821
Total Operating Expenses.....	160,974	210,829

Net Operating Revenue.....194,630 225,992
Treating the mileage cited as though it were average mileage for each year, we thus see that, while the length of road increased by 9.4 per cent, the net earnings increased by 16.1 per cent, and the net earnings per mile of road by 6 per cent. Other income was £36,652, bringing total income, before taxes and charges, to £262,645. Taxes and interest charges absorbed £221,834, so that the surplus for the year 1912 was £40,811, comparing with the £35,548 in 1911, which served to extinguish a debit balance of £30,900 to profit and loss account on January 1, 1911. On the strength of this result the American company declared a dividend on its Seven per Cent, Cumulative Preferred stock to October 1, 1908, absorbing £37,773, the payment of which will leave it a balance of £7,580 at the credit of profit and loss as at the end of 1912. In all these money figures we have taken the peso as equal to two shillings.

For this dividend on Manila Railroad Preferred stock the English company has taken credit in its 1912 revenue account, bringing its gross revenue to £221,000. From this amount have to be deducted £16,000 for general interest, £155,000 for bond interest, and £5,000 for office and general expenses, showing a surplus of £45,000 on the year. In respect of 1911 a dividend of 1 per cent, was paid in July, 1912, on the £2,000,000 Five per Cent, Non-Cumulative Preference stock, leaving £60,000 brought forward to the 1912 revenue account, so that the board have £105,000 to deal with. They again propose to pay 1 per cent, on the Preference stock, leaving £85,000 to be carried

forward. The company therefore earned $2\frac{1}{4}$ per cent, on its Preference stock, and it is proposed to carry forward the equivalent of $4\frac{1}{4}$ per cent.

This displays a rational and prudent policy as to dividends, to which the board may be trusted to adhere. Distinctly optimistic forecasts were made in the market as to the dividend to be paid on the Preference stock this year, which doubtless account for the price having been as high as 43. The present price of 34, however, shows no very violent reaction, as such things go, and a 3 per cent, basis must be held to reflect the most hopeful views of the future of the stock. The stock, however, is said to be chiefly in strong hands, and, looking forward five years to the completion of the herring-bone formation of the whole present construction programme, that optimism is probably justified. Once the £100,000 annually which is needed to pay the full Preferred dividend is comfortably in sight it will require but very little progress, relatively, to bring the £10 Ordinary shares into the dividend-bearing line, for there are less than £400,000 of them in amount. The shares are not officially quoted, and dealings are so infrequent as to be always a matter of negotiation; but the price of about 55s. clearly indicates, under the circumstances, that there are those who indulge the most roseate anticipations as to the company's future.

At the meeting of the shareholders a year ago the chairman of the company read an extract from a mercantile periodical published in Manila, and in no way connected with the railway, one portion of which may appropriately be quoted:—

The experience of the railroad, even in the short distance which it has gone, has shown that the resources of the country have been most inadequately estimated. Where the planters are unable to get to market that which they are already producing they have little incentive for increasing the area under cultivation; but now that the railroad is taking out produce that formerly was allowed to rot on the ground unheeded, and their incomes are being augmented by what formerly brought in nothing, they are turning their attention on every side to extending their present area of cultivated ground.

An example of the manner in which the line "makes traffic" may be cited. Three years ago the company prepared to deal with the orange crop in the Santo Tomas district, and estimated the amount to be hauled at 1,500 tons. In the event, the output was six times that bulk, or 9,000 tons. Much land is being newly brought under cultivation, and while that development is going on rapidly, there is little prospect of its being checked for some years to come. On the whole there is at least a fair prospect of the company's property earning an adequate return for its owners by the time the construction now in course of being carried out is complete, and, in view of the improved earnings of the last two years, it will not be very surprising if that happy stage is reached even earlier.

The Baguio Branch.—The *Manila Daily Bulletin* reports:—So far has the construction work on the Baguio branch of the Manila railroad progressed that the passenger equipment has been ordered and is expected to arrive in Manila during the latter part of 1914.

On the 39.9 kilometers of the branch grading has been completed on 12 kilometers of the Aringay end and on an equal stretch of the Baguio end.

So far P1,773,415.71 has been expended for construction purposes, including the contractors' profits. Of this sum P1,181,277.26 was used for the section between Aringay and a point near the Irisan river. The remainder was expended on the section between the Irisan river and Baguio.

Sixty per cent, of all the grading quantities along the road have already been moved, and on June 30 seven kilometers of track had been laid. The construction of bridges along the railroad

has not progressed very far, but from now on bridges will be put in in rapid succession. Three of the 123 bridges have already been completed. Bids have been solicited for 30 more.

The special rack-track material which will be used for 14 kilometers of the road where a rack-track system will be installed has been ordered, and delivery is expected to begin soon. One second-hand rack locomotive has been delivered and will be used for construction purposes. Six rack locomotives will be used in the regular service. Of these three are expected to arrive here by March, 1914, and the remainder by November, 1914.

Of the three tunnels, the one nearest Aringay is nearly completed. Satisfactory progress has been made on the other two.

Between 2,000 and 4,000 men are constantly being employed on the construction work. At the present time the construction force numbers 3,500.

SIAM

The Royal Railways.—A correspondent writes to the *Bangkok Times*:—Railhead is about twenty kilometers away from Nakon, and Phra Ramphai thinks it might be at Nakon in two months' time. But although the earth work is ready no bridge timbers are out. The bank through the deep swamp at Nakon is made only half width until railhead gets through, when material can be more cheaply obtained to complete it.

From Ronpiboon the Singora railhead is being pushed out to the west some five miles to a quarry there before being carried into Nakon. Blasting of rock cuttings is still in progress to the east of the tunnel, whilst a lot of concrete work has still to be done. Timber work here is fairly well advanced. As far as the tunnel itself is concerned it is very hot, and one risks a broken leg in the semi-darkness and a cold on coming out. The heading is through and the widening out and lining is now just over 90 metres in. Some 160 metres remain to be widened out and lined before a train can pass through. Then work will be commenced on a big culvert under a high bank just east of the tunnel. About fifteen months ahead the railheads will probably join up, certainly not under twelve. Siamese labour has now replaced the Indian and Chinese to a great extent in the tunnel.

Happily with age the colours of the station at Trang are being toned down: still one gets a reminder of their one time brilliance from the priming coat still to be seen on the inside of the pumphouse windows. The passenger trains now run once daily between Trang and Kao Kao. Some attention would seem to be necessary to the roofs, and in a shower the rain comes through the innumerable ventilators and sides of the new stock. Bogie rolling stock will be a big improvement on the track. It will be about December when passenger traffic is opened to Tung Sawng. North of Kao Kao many timber bridges still remain to be built, and the line has yet to be lifted clear of the floods in some places. While the line south of Kao Kao is open for traffic much remains to be done, and we were often forced to cross bridges between Tap Teang and Trang "dead slow." On this section some bridges have been rebuilt and others are in hand. A large number of bed sleepers are now being replaced.

At Trang itself the foundations of some of the buildings are giving trouble. The engine shed is cracked in one or two places, and the turntable at high tide is partly flooded. The yard levels would appear to be too low.

SOUTHERN LINE TENDERS

The contract for the supply of eight bogie carriages for the Royal Southern Railway, tenders for which were opened on May 17th, have been awarded to Messrs. Cravens, Ltd., Sheffield. The prices quoted were f. o. b. Middlesboro £14,495 c. i. f. Bangkok £15,897, delivery in 40 to 46 weeks.

MALAYA

Federated Malay States Railways.—The following is from the *Malay Mail*:—The F. M. S. Railways reflect in striking manner the trade expansion of the country. The annual report for 1912, signed by the General Manager, Mr. P. A. Anthony, is published as a supplement to the *F. M. S. Government Gazette*, and if it shows an appreciable rise in working expenses this was to be expected, especially in view of the greater cost of materials and labour, which is one of the principal causes. This remarkable trade development, as Mr. Anthony remarks, continues, and critics of the Department should remember that the extra labour it entails upon the officials came in the train of troubles over which they have had no control. Congestion and delay were to a certain extent inevitable, much as they are to be deplored. The report at the outset emphasises the great importance of the past year in Railway development, for 1912 witnessed the inclusion under the F. M. S. Railways administration of the Johore State Railway and the Singapore Government Railway. The sum for the purchase of the latter was voted at the last meeting of the Federal Council, and the amount set aside for the Johore Railway approved by Council, who heard from the Chief Secretary, Sir Edward Brockman, that it is possible the further negotiations with the Johore Government may come to nothing. Be this as it may the year 1912 in every way added greatly to the responsibilities of the F. M. S. Railways administration.

The report mentions that the dividend earned on a capital of \$59,444,038.84 was 4.56 per cent. after paying the rents of leased lines, "as compared with 6.03 per cent. Federated Malay States Railways only in 1911." One excellent result of increased business has been the reduction in fares and rates which it has enabled the Railways to allow. On the first class fare this reduction has been from six cents to five cents per mile, and on the second class from four cents to three. The past year also saw a big drop in parcel rates and the sum charged for the carriage of firewood. Then also, truck rates were introduced for constructional steel and iron work, corrugated iron, rubber cups in cases and crates, and wooden cases or chests in parts for making up into rubber chests. All classes of goods over long distances are now carried at a reduced figure.

The total mileage of lines open for traffic, including those leased on December 31st, 1912, was 734 miles, 15 chains, an increase of 175 miles, 13 chains. This includes the Semantan-Kuala Krau and Kuala Krau-Kuala Teh lines opened during the past year. The length of sidings with the increase provided in 1912 is given as 92 miles, 23 chains, with 826 miles, 38 chains of railroad now in operation. The capital account on the open lines amounted to \$59,444,038.84 at the close of the year under review, representing an increase of \$4,730,745.28 over 1911. In the total expenditure on account of special services on capital account during the year, \$1,156,981.31, the largest sum is \$210,948.46 for additional wharf accommodation, and \$102,181.87 for a new timber tongkang wharf, at Port Swettenham. For the new Station and Hotel at Ipoh \$125,248 was provided, and other necessary expenditure, the totals of which reach somewhat similar amounts, was upon additional passenger stock, locomotive, and goods vehicles.

It is interesting to note that the average capital cost per mile of line open to December 31st was \$99,333.04, considerably higher than that at the end of 1911. A number of lines are still under construction, and will materially add to the length of railways operated. The capital account of these amounted to \$5,283,227.54, an increase of close upon a million dollars. Much has been done in the direction of permanent and trial surveys. As a revenue earner the Railway continues to forge ahead, and the gross earnings from all

sources, including motor services, amounted to \$8,421,016.87 as compared with \$7,718,239.75 in 1911, an increase of 9 per cent. The gross working expenses were heavy—\$5,754,671.64, the increase being well over a million dollars. A sum of \$527,073.88 appears in this connection under the heading of engineering. In 1912 the railways carried 11,589,273 passengers, an advance of 1,240,377.

There are many other figures of interest in the report, which, on the whole, considering the exceptional circumstances previously referred to, may be regarded as satisfactory.

MONGOLIA

Railway to Kiachta.—The Russians have commenced the construction of the Railway Line from Werchne-Udinsk to Kiachta.

MANCHURIA

South Manchuria Railway.—Y. 43,632 was the daily average of the S. M. R. traffic returns for the last decade of July. It denoted an increase of Y. 12,121 on the corresponding period of last year. The daily average for the whole month of July was Y. 44,187, being an increase by Y. 7,850 on the corresponding month of last year. Figuring since the beginning of last April, the aggregate receipts up to the end of July amounted to Y. 6,528,269, which means an increase of Y. 1,461,716.

TRAMWAYS

Shanghai Tramways

The following is the traffic return of the Shanghai Tramways (Foreign Settlement) for the month of July, 1913, and for seven months ended July 31, 1913, with figures for corresponding periods last year.

	July, 1913.	July, 1912.
Effective Receipts . . .	\$86,676.91	\$68,758.03
Passengers carried . . .	4,552,571	3,580,909
Car Miles run	262,808	240,511
Loss by depreciation of subsidiary coinage . . .	24,666.24	21,628.97
Percentage of loss by depreciation of subsidiary coinage . . .	23.24	25.42
	7 months ended July 31, 1913.	7 months ended July 31, 1912.
Effective Receipts . . .	\$510,091.87	\$449,438.58
Passengers carried . . .	25,897,237	22,769,485
Car miles run	1,619,119	1,593,133
Loss by depreciation of subsidiary coinage . . .	141,048.89	139,335.79
Percentage of loss by depreciation of subsidiary coinage . . .	22.94	25.23

Week ended July 23, 1913:—

	1913.	1912.
Effective receipts (after deducting loss on subsidiary coinage). . .	\$ 17,998.73	\$ 15,065.80
Passengers carried . . .	958,032	789,071
Car miles run	55,579	54,647

The loss by depreciation of subsidiary coinage for the week was equal to 23.58 per cent. of the gross cash collected on the cars, as compared with 25.36 per cent. for the corresponding week last year.

Week ended July 30, 1913:—

	1913.	1912.
Effective receipts (after deducting loss on subsidiary coinage). . .	\$ 24,187.06	\$ 15,782.80
Passengers carried . . .	1,248,331	805,007
Car miles run	36,810	54,085

The loss by depreciation of subsidiary coinage for the week was \$6,976, equal to 23.29 per cent. of the gross cash collected on the cars as compared with \$4,786, equal to 24.70 per cent. for the corresponding week last year.

[During the week ended July 30 the passengers carried on the International Settlement tramways totalled 1,248,331,—a record figure. Practically 3,000,000 coins, weighing about twenty-two tons, were collected].

Week ended August 6, 1913:—

	1913.	1912.
	\$	\$
Effective receipts (after deducting loss on subsidiary coinage). . .	20,208.15	16,008.76
Passengers carried . . .	1,062,236	828,376
Car miles run	59,885	54,878

The loss by depreciation of subsidiary coinage for the week was \$5,917.75, equal to 23.66 per cent. of the gross cash collected on the cars as compared with \$4,843.66, equal to 24.54 per cent. for the corresponding week last year.

The Nantao (Shanghai) Tramway.—The Nantao Tramway began operations early in August.

FINANCIAL

Hongkong and Shanghai Banking Corporation.—The 96th half-yearly meeting of this Bank was held at Hongkong on August 16, Mr. S. H. Dodwell presiding.

The Chairman said: Gentlemen,—The report and statement of accounts having been in your hands for some time, I shall, with your permission, take them as read. I think you will agree that another very satisfactory result is added to the records of the Bank, and I trust you will approve of the proposed division of profits, which is practically the same as the distribution made at this time last year, viz.:—

A dividend of £2 per share.

\$250,000 added to the silver reserve fund.

\$250,000 written off Bank premises account.

The balance remaining to be carried forward to the current half-year amounts to \$2,052,482.91, being some \$41,000 more than was brought in from the previous account. You will see from the report that a part of our earnings has again been diverted to writing down sterling reserve fund investments. The great demands on capital of late and consequent high rates of interest obtainable have caused a further decline in all first class securities, making it necessary to readjust our book values below the point which, last year, we had hoped would prove low water mark.

Our holding of £1,200,000 Consols has been written down from £900,000 to £864,000 and now stands in the books at 72, and other sterling securities from £334,950 to £329,100; to effect these adjustments and maintain the fund at £1,500,000 we purchased £45,000 3 per cent. exchequer bonds due 1930 at 97½, which have been placed in the books at 93. The net cost, viz., £43,918 11s. 11d. at 1/11½, —\$447,340.60, was, as already mentioned, met out of the half-year's profits. Recent experience makes one somewhat diffident in venturing an opinion with regard to future values of even first securities: I shall therefore confine myself to the remark that our investments seem to be written down to very conservative figures.

I may mention that the same remark also applies to investments outside the sterling reserve fund, appearing in the accounts under heading of "Indian Government Rupee Paper," and "Colonial and other securities." Apart from the sterling reserve fund, there are few changes of outstanding interest in the figures of the balance sheet. The total of current accounts and fixed deposits in gold is £9,300,000 against £10 millions on December 31 last and £9½ millions on June 30, 1912, and

silver current accounts and fixed deposits stand at \$30 lakhs, below the December figures, but \$53 lakhs higher than at this time last year. Bills payable show an increase of some \$10 millions compared with the figures of a year ago, while on the other side of the account, cash, coin lodged with the Government against note issue, and bullion in hand and in transit, taken together, are \$78½ millions against \$69 millions on June 30, 1912. Bills discounted, loans and credits and bills receivable approximate closely to the figures at this period last year. The only other item to which I shall refer is Bank premises account. This now stands at \$61 lakhs and will be further increased during the present half year by some \$6 or \$7 lakhs for expenditure still to be met. I am sure the policy of continuing to write down our property will commend itself to you. The new building in London is nearing completion, and you will be pleased to hear that we expect to move in some time next month.

Active trade conditions practically all over the world and a good demand for money in most countries have been the features of the period under review, and China, notwithstanding political unrest, has shared in the general activity to a greater extent than might have been expected, if we take into consideration the unprecedentedly large accumulations of silver in the form of bars, dollars, and sycee in Shanghai and North China. Owing to unsettled conditions hard coin has no doubt gravitated to the Treaty ports as being the safest depositories and trade has naturally been handicapped by the fact that money, instead of circulating freely, is being hoarded. Conditions in China were steadily improving until the outbreak of the recent trouble caused another setback, and I regret to say that at present business generally is seriously hampered. It is to be hoped that these internal disturbances will speedily end, as once confidence is restored and merchants are able to move goods with safety, I feel sure we shall see trade active in the Far East.

With regard to the present disturbances, I should like especially to refer to Shanghai, where the recent fighting was the cause of considerable anxiety. I cannot but think that in view of the large population and enormous financial interests in the Foreign Settlements of Shanghai, steps should be taken to prevent life and property being exposed to such grave risks as those lately encountered. The interests of China are identical with those of other nations in this respect, for it is conceivable that losses could be incurred of such magnitude that an indemnity to meet them might cripple the country financially for many years.

When addressing you in February last, my predecessor in the chair announced to you that a satisfactory agreement had been arrived at between the Chinese Government and the Sextuple Group with regard to the terms of a loan of £25,000,000, the concluding formalities of which awaited only the completion of arrangements between the Chinese Government and the Powers interested for the appointment of suitable foreigners to the advisory and executive posts contemplated by the loan agreement. The discussion of this matter took longer than was anticipated, and in the meantime, in the latter part of March, the unexpected announcement was made that the American Group, for reasons which were published in an official communication to the Press, had withdrawn from the Sextuple consortium. The American share was, however, taken over by the five remaining groups, and, on April 26, with the approval of their five Governments, the reorganization loan was signed.

The loan of £25,000,000 was issued on May 21 simultaneously in London, Berlin, Paris, St. Petersburg and Brussels, and the success it achieved bore testimony to the concurrence of the public with the wisdom of the policy which had been so patiently adhered to by our own and the other Governments, and the necessity for proper safeguards in respect to security and the expenditure of funds, on which that policy was based. The purpose of the loan, after

liquidating the arrears of the Boxer Indemnity due to the Powers for 1912, aims at releasing the provinces from the present drain upon their resources by the consolidation and centralization of provincial loans contracted under the late dynasty and by the disbandment of unnecessary troops: while, at the same time, it provides the Chinese Government with substantial funds for carrying on the administration during the period of transition from a provincial to a centralized fiscal system, and for the reorganization and reform of the revenue which constitutes the security of the loan.

The efforts of the elder statesmen in Peking to grapple with the immense problems which surround this task of financial reorganization are being watched with the keenest anxiety by all who have the interest of this great country at heart, and who believe, like ourselves, in its recuperative power and immense capability for development under a wise financial administration. It is not too much to say that upon the result of these efforts depends the whole future of China, and her ability to borrow on the markets of foreign nations the further sums which are still essential for the industrial development on which she must depend for her growing economic needs. The solution of these grave and vital questions cannot but be retarded, and the future of the country jeopardized by persistence in party strife and jealousies. The restoration of political cohesion and financial stability must outweigh and precede constitutional ideals, and I express the earnest hope that the younger politicians of China will realize in what direction the efforts of true patriotism should lie, at this, the gravest juncture in the history of their country. Before sitting down, I would like to take this opportunity to express the regret felt by your directors at the retirement of Mr. H. E. R. Hunter. Mr. Hunter has rendered valuable services to the Bank, and I think it only right to refer specially to the able manner in which he managed our Shanghai branch through very trying and difficult times. His sterling qualities are known to everyone who came in contact with him, and I feel sure I voice the feelings of you all in expressing very sincere regret at the loss of his services and in wishing him many happy and prosperous years at home. Before moving the adoption of the report and accounts as presented, I shall be pleased to answer any questions you may put to the chair.

There were no questions, and the Chairman proposed the adoption of the report and statement of accounts, as presented.

Mr. Young said—Gentlemen,—I think you will all agree that the statement the chairman has put before us is a very satisfactory one, and results largely from the talented administration of the Bank's affairs. It is very satisfactory to see the sterling reserve kept at a realizable value of £1,500,000, although to do this has necessitated large drawings from the half-year's profits, and it is to be hoped that we have seen the last of such expenditure. As our chairman pointed out, in this part of the world we have been living in troublous times, and it is with some relief that the present position permits us to have reasonable hopes of a period of peace. It is particularly pleasing to see China emerging from her troubles without, so far as we know at present, having handicapped her development by making herself liable for indemnities to foreign Powers. We now look forward to the times when good government will eliminate such risks as have been recently run by the inhabitants of Shanghai and other Treaty ports. Gentlemen, it is with much pleasure that I second the report. The motion was carried unanimously. The appointment of Mr. P. H. Holyoak and the Hon. Mr. D. Landale as directors was confirmed.

The following relate to Japanese banks:—

Teiyu Bank.—This Bank made a profit of Y125,090.11 for the last term, paid a dividend of 8 per cent. and carried forward Y51,770.57.

Kanagawa Agricultural & Industrial Bank.—This bank made a profit of Y61,328.50 for the last term, paid a dividend of 9 per cent. and carried forward Y11,346.70.

Dai Ichi Ginko.—This bank made a profit of Y990,068.58 for the last term, paid a dividend of 10 per cent. and carried forward Y666,207.62.

Tokyo-fu Agricultural & Industrial Bank.—This bank made a profit of Y132,280.40 for the last term, paid a dividend of 5 per cent. and carried forward Y25,389.40.

Hypothec Bank of Japan.—This bank made a profit of Y1,190,586.34 for the last term, paid a first dividend of 5 per cent. and a second dividend of 10 per cent. and carried forward Y106,189.65.

Dai San Ginko.—This bank made a profit of Y277,445.22 for the last term, paid a dividend of 12 per cent. and carried forward Y25,070.58.

Fifteenth Bank.—This bank made a profit of Y2,218,633.52 for the last term, paid a dividend amounting to Y810,000.00 and carried forward Y896,817.95.

Yasuda Bank.—This bank made a profit of Y457,020.82 for the last term, paid a dividend of 3 per cent. and carried forward Y55,568.29.

Dai Ni Ginko of Yokohama.—This bank made a profit of Y214,154.16 for the last term, paid a dividend of 8 per cent. and carried forward Y90,394.16.

Fudo Savings Bank.—This bank made a profit of Y57,809.16 for the last term, paid a dividend of 12 per cent. and carried forward Y21,809.16.

Tokyo Bank.—This bank made a profit of Y181,877.80 for the last term, paid a dividend of 10 per cent. and carried forward Y29,912.22.

Tanaka Bank.—This bank made a profit of Y45,206.45 for the last term, paid a dividend of 8 per cent. and carried forward Y12,206.45.

Toyokuni Bank.—This bank made a profit of Y183,068.39 for the last term, paid a dividend amounting to Y140,000.00 and carried forward Y9,452.47.

Teikoku Shogyo Ginko.—This bank made a profit of Y145,114.27 for the last term, paid a dividend of 6 per cent. and carried forward Y18,486.66.

Tokai Bank.—This bank made a profit of Y104,262.18 for the last term, paid a dividend of 8 per cent. and carried forward Y76,814.39.

Hundredth Bank.—This bank made a profit of Y309,264.64 for the last term, paid a dividend of 10 per cent. and carried forward Y44,264.64.

84th Bank.—This bank made a profit of Y62,033.94 for the last term, paid a dividend of 8 per cent. and carried forward Y21,476.48.

Deutsch-Asiatische Bank.—The report of the Bank for 1912 was as follows:—

The political situation of China has not yet been fully cleared during the period under review and the contrast between the North and the South of the country, which was during the previous year of decisive influence for the outbreak of the revolution, has not yet been adjusted. Nevertheless, setting aside a few local disturbances, the peace could be maintained, and considering the country has such an old history and a population, which adheres more tenaciously than other nations to old traditions, the extraordinary transformation from the Empire, sacred for thousands of years, to the Republic was effectuated under comparatively

insignificant convulsions of the gigantic realm. By far the greater part of the country remained till now untouched by the inner political movements. However if the further development will be effectuated in the same peaceful manner, after a parliament has been created for the first time by which the whole country shall participate at the formation of its destinies, is a question about which it is difficult to form an opinion.

The political situation of the country during the business year has not exercised a considerable influence on commerce. The fact that the single individual was comparatively little effected by the consequence of the Revolution, in conjunction with other favourable circumstances, as good harvests, rising prices for raw-products shipped from China caused the exports to increase considerably.

In consequence of the thereby increased purchasing power of the population and fostered higher value of silver a rise of imports into China is also evident.

A drawback preventing the full development of the favourable moments just pointed out was the unsatisfactory financial position of the Government. The service of the foreign loans could be upheld, however the country requires large means, to carry through reforms and measures which are necessary for the consolidation of the inner conditions.

At the beginning of the period under review, therefore, the Government entered into negotiations with the international Sextuple Group with the object of contracting for a loan of £25,000,000. In the meantime the American Group has retired from this syndicate. The final agreement has been signed a short time ago; we are interested in this loan, out of the proceeds of which also the advance amounting to about Taels 12,000,000—granted to the Chinese Government on which we reported a year ago are to be repaid to the negotiating groups.

The value of the Mexican Dollar in circulation in China has declined again to its normal price; on the 31st of December, 1912, the relation in the value of the Dollar to the Shanghai Tael was 100: 73 5-8 against 100 79-3-5 on the 31st December, 1911.

We have therefore credited again the "Valuta Ausgleichs-und Dispositions-Fonds" for the amount taken from it last year.

The economical development of Japan has also made satisfactory progress, exports as well as particularly the import trade show a considerable improvement. The result of our branches, with an increased turnover, were a little better than during previous year, they were, however, as before influenced by the keen competition of Japanese banks.

India had again very good harvests, the foreign trade has therefore increased considerably as compared with the previous year. The results of our branch in Calcutta are satisfactory. The hoarding of gold noticed for some years already could also be observed in an increased manner during the last year under review, and the importation of silver for private account fell off. However on account of the good proceeds derived from the harvest an increased demand for silver coin made itself felt in such a way as to cause the Indian Government to buy £6,000,000 worth of silver for coining purposes. This as well as the brisk demand for silver from China in expectation of the aforesaid great loan, exercised a decided influence upon the movement of the silver market and raised the rates under considerable fluctuations to a height that had not been attained for five years.

The traffic of the Shantung Railway shows a further considerable increase, which is also shown by the financial results of last year's working. It will be proposed to the ordinary General Meeting to distribute a dividend of 7½ per cent. for the year 1912 on shares and M 12.50 on Net-Profit certificates. Negotiations with the Shantung Mining Company were entered into and concluded quite recently and the Mining Company as a whole will be taken over by the Railway Company. The share-

holders of the Mining Company will receive for their property of M 12,000,000 shares, nominal M 5,400,000 shares of the Shantung Railway Company with coupons attached for dividend from 1st January, 1913. Through this amalgamation the funds will be provided for a rational development of the mines so that it can be relied upon that the output of the mines will yield adequate revenue to the Shantung Railway Company in future.

Our Investment Account consists principally of Loans to different Chinese Provinces which are guaranteed without exception by the Central Government. The latter has promised to effect the repayment of these loans with accumulated interests out of the proceeds of the above mentioned reorganisation loan, while so far the provinces have been debited with the interest.

As regards the law suit repeatedly referred to in our former annual reports and brought against us by the Imperial Treasury in the year 1907 judgment was given in our favour by the two lower courts. However the Supreme Court reversed the decision and referred the case back to the Lower Court [Kammergericht] which following the direction given by the Supreme Court after a new sitting gave judgment against us. The Managers as well as the Directors are unanimously fully convinced that the Bank is wronged by this lawsuit and that the judgment of the Supreme Court is based upon a conception of circumstances contradictory to commercial principles. Highly esteemed commercial experts who are quite independent from our bank have confirmed in long elaborations the view we have taken in the matter. As it is not impossible in the face of the attitude of the Supreme Court that notwithstanding our opposite view of the case the final issue of the lawsuit will be unfavourable to us, we have thought it expedient to put aside an amount of Taels 140,000—M 350,000. The loss of such a big amount would be felt so much more severely as this difference which resulted from the settlement of exchange contracts made on behalf and in the interest of the German Government would mean an extra profit to the Imperial Government because they have received all the money which they could demand from the Chinese, while we have derived no benefit out of the transaction except the usual commission we have charged. To our knowledge no other Foreign Government has claimed from their respective bank a corresponding amount. Without this amount set aside we would have been in a position to propose a higher dividend then 5 per cent.

At the end of the business year Dollar and Tael banknotes of our issue were in circulation to the amount of Taels 2,200,989.94.

Our Mortgage Department with its limited field of operation could again do a very trifling business only and has therefore closed with a loss.

We have dissolved the Delcredere account figuring in our last balance sheet and transferred the amount of Taels 20,000 to the Special Reserve Fund.

We propose to distribute the net profits amounting to Taels 512,087.08 as follows:

Transfer to Special Reserve Fund.....	50,000.00	
Dividend M 125 00 per share = M 937,500.00		
a M 2.50 p. Tael....	375,000.00	
Director fees.....	6,521.74	
Amount carried forward..		
ward to New Ac..		
count.....	80,565.34	512,087.08

We have nothing to add to the report, balance sheet, and profit and loss account, which have been examined and found correct by the Auditors' and we propose they should be adopted.

Messrs. Geheimer Kommerzienrat Hugo Oppenheim, Kommerzienrat Albercht Otto, Director S. Schwitzer and Mr. Franz Urbig retire from the Board of Directors by rotation and are again eligible.

At the end of the business year Mr. Curt Erich retired as manager of the bank, to which

he belonged since its foundation. We wish to express our gratitude and thanks for the valuable services he has rendered to the Bank during this time. We shall propose at the shareholders' meeting in order to preserve his experience to the Bank to elect Mr. Erich as member of the board of directors.

Loan to Hunan—Considerable discussion has taken place in regard to a loan alleged to have been made to Hunan by a Japanese company called the Asahi Shokai. We take the following from the *North-China Daily News*:—The following is a translation of the contract for the loan to Hunan of Y.10,000,000, subsequently increased to Y.15,000,000, which the Provincial Assembly of Hunan concluded on July 26.

The Governor of Hunan Province, in order to extend the mining administration, orders the Hunan Provincial Treasurer and the Hunan Board of Mines hereby to contract with the Japanese Sunrising Company a provincial loan. The articles are as follows:—

1. The total amount of the loan is Y.10,000,000, of which Hunan receives 89 per cent.

2. The loan is to be paid in three instalments of Y. 5,000,000, Y. 3,000,000, Y. 2,000,000, the first instalment to be handed over within one month after signing the contract, the second instalment within six months, the third within twelve months

The whole amount is to be handed over in Shanghai. No charges to be paid for expenses, exchange, etc., apart from the commission of 11 per cent. indicated above.

3. This loan to be used only for opening mines, but for the temporary financial necessities Y. 5,000,000 should be deposited in the Hunan Government Bank for lowering exchange. The rest of the loan also to be handed over to the Hunan Government Bank whence the money is to be paid to the Hunan Board of Mines according to order papers issued by them. The Company can inspect the proper use of the money at any time.

4. The interest of the loan is to be 6 per cent. per annum, beginning from the day on which the money is handed over, and paid half-yearly. The interest will be paid in Shanghai. If there are no profits on mining, the interest will be paid by the local salt gabelle.

5. The limit of the loan is twenty years. For the first five years only the interest is to be paid. From the sixth to the tenth, Y. 400,000 of the original capital will be repaid annually with the interest. From the eleventh year onwards, interest and repayment of capital will be forthcoming according to equitable arrangements. This money to be deducted from the selling price of mineral ores. If the mining is not productive repayment will be made as under Article 4. The Hunan Government may repay the whole loan after fifteen years.

6. The security for this loan is the Government mines, except the Suikowshan lead ore mine. (On this mine there is already a foreign loan.—Ed.)

7. Until the Company has inspected the Pingkiang gold mines and Kiangwah tin mine, a second security for this loan is the local salt taxation. As soon as the above-mentioned two mines can produce Tls. 1,000,000 every year the second security will be cancelled.

8. The Company will recommend a good mining engineer to Hunan, to be in charge of all Government mines, for whom salary and other expenses will be arranged afterwards.

9. The mining produce will be sold through the commission of the Company for twenty years (Suikowshan mine is excepted.) The price will be reckoned according to London quotations.

10. The Company will put a man in Hunan to advise the mining business and to look after finance.

11. If the Hunan Government wants to raise another loan for mining purposes it must first consult with the Company. If no arrangement is concluded within six months, the Hunan Government may negotiate with another Company. The Company will have the right of supplying machinery and materials if on terms as good as those offered elsewhere.

12. Four copies of this contract signed by the Hunan Provincial Treasurer and by the Board of Mines, chopped by the Hunan Governor, should be written both in Chinese and Japanese, one for the Hunan Governor, one for the Japanese Consul in Changsha, one for the Hunan Provincial Treasurer, and one for the Japanese Sunrising Company.

The Industrial Bank of China.—We are informed that the Banque Industrielle de Chine, a joint stock company with a capital of Frs. 45,000,000, has been definitively and legally constituted in Paris, on the 5th of July, 1913. The Board was elected at the meeting of the shareholders and formed as follows: MM. Andre Berthelot, President; Liao Sze Kong and Eugene Henry, Vice-presidents; Sir Richard Awdry, Georges Ballu, Raoul Calary de Lama-ziere, Rene de Cernville, Paul Chautard, Comte Arthur Espinasse de Villesboinet, A. Frezouls, Comte Gerard de Ganay, J. Perchot, Charles Victor. The Banque Industrielle de Chine has its Head Office (siege central) in Peking and its registered office (siege social) in Paris, 13 Boulevard Haussmann. The General Manager is M. A. T. Pernotte.

Foreign Loans for Japanese Companies.—Japanese industrial concerns—the Oji Paper Mill among them—are, says the *Asahi*, negotiating with London banks direct for loans, taking a new departure in the method of borrowing from abroad. Business loans raised abroad in the past have generally been in the form of debentures, or have consisted in machinery imports representing cash. The Oji Paper Mill Company has just negotiated a loan of Y.2,000,000 bearing $7\frac{1}{2}$ per cent. interest from the London County and Westminster Bank, through the medium of the Mitsui Bank and guaranteed by the Specie Bank. This example has been followed by the Ensuike Sugar Company, of Formosa, which has negotiated a loan of Y.2,000,000 bearing interest at $7\frac{1}{2}$ per cent. from Parr's Bank, through Messrs. Samuel Samuel & Co., and by the Kanegafuchi Spinning Company, which has negotiated a loan of Y.1,000,000 at about 7 per cent. interest through the Mitsui Bank from the same London bank. For these loans the Japanese companies have drawn promissory notes. The term of the notes drawn by the Kanegafuchi Spinning Company, continues the *Osaka Journal*, is three months, which it is agreed may be renewed indefinitely. The credit banks and other banks interested in the loan are each to receive a commission of 1 per cent., the rate of interest to be based on the official rate of the Bank of England, which is now ruling at $4\frac{1}{2}$ per cent. When the commission payable to the banks and the expenses of exchange are added, the interest rate will amount to about 7 per cent., which is no lower than the rate in Japan. But these loans have been contracted in anticipation of a further advance of the rate in Japan. The money was expected to be received by the Kanegafuchi Mill and the Oji Paper Mill by the middle of August.

Anglo-Japanese Bank.—The Seventh Annual General Meeting of the shareholders of the Anglo-Japanese Bank (Limited) was held at Winchester House, Old Broadstreet, London, Mr. Alexander F. P. Roger, the chairman, presiding.

The London Manager and Secretary (Mr. Arthur H. King) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts, observed that some seven years ago the company was formed for the purpose of transacting banking business in Japan,

but for the first five years of its existence a period of abnormally cheap money prevailed in that country. It was true that that period seemed to have come to an end—at all events, temporarily—but the experience they had gained was that the difficulties in the way of an English bank doing business in Japan were very great, owing, among other things, to the necessity of relying in a great measure on Japanese advice and, to a certain extent, losing English control. There had been many other real difficulties operating against the bank, but the directors had loyally and assiduously attended to the interests of the shareholders.

Not being able to employ all their funds in Japan they had been obliged to work up business and a connection on this side, and that part of the business had proved to be more remunerative than the Japanese business—so promising, indeed, that the directors considered it should be encouraged, and developed. A small and profitable business had been built up in Japan, and it was proposed to continue to develop it. He had received one or two letters from shareholders expressing regret, and, he thought, probably justifiable impatience, at the fact that the directors were unable to declare a dividend on that occasion, and suggesting the liquidation of the Bank. Because he joined the board representing large shareholders who did not acquire their shares until recent times, he thought that he, above all others, was in a position to express an opinion as to whether liquidation at that juncture was or was not desirable, and he gave his opinion unhesitatingly in the negative. The bank was now doing a small but sound business, which was capable of considerable expansion. New blood had been infused. New connections had been and were being secured, and, given time, he felt confident that they could make the bank a successful institution. (Hear, hear.)

Turning to the accounts, he stated that the figures as a whole showed expansion, in view of which the directors had strengthened the bank's financial position, cash on hand being up £10,000, loans and advances by them were £18,000 more, while the two items of bills discounted and bills receivable, taken together, showed an improvement of more than £9,000 over last year's figures. Perhaps the most satisfactory feature of the accounts was the growth of the current and fixed deposits from £6,000 to £40,000. The whole of the increase of deposits was in London, which was a significant point. The directors had thought it desirable to make a special reserve for doubtful debts and other contingencies amounting to £5,000. They had, in addition, transferred £10,000 to reserve, increasing it to a total of £35,000, and leaving a balance of £4,571 to be carried forward. The depreciation in their investment had considerably increased since the date of the last balance sheet—an experience shared by other similar institutions, but they believed that the depreciation would diminish. The largest shareholders were doing everything in their power to increase the business of the bank, and the directors felt that the other shareholders should follow suit. (Hear, hear.) As the business expanded in this country, it might be that it would be desirable to alter the name of the bank, so as to cover a larger area for their operations. It might be also that, as the business expanded, they would have to increase the capital, but the directors would postpone that step as long as they possibly could.

Mr. J. MacAndrew seconded the motion.

In the discussion which followed, dissatisfaction was expressed at the position of the bank, and an amendment was brought forward for adjourning the meeting for three months and appointing a committee to inquire into and report upon its affairs. Other speakers, however, thought that further time should be allowed to see if the bank could be placed on a dividend paying basis. Dissatisfaction was also expressed at the resignation by Sir Westby Perceval of the chairmanship of the company and of his seat on the board.

The Chairman, in reply, said that for the reasons he had stated, and in the interests of the bank, he could not put the amendment. Sir

Westby Perceval had piloted their ship through very troubled waters, and had thought that, as he had brought the vessel into what he conceived to be smooth waters, he was entitled to retire. (Laughter.) The depreciation in the bank's investments was almost entirely in those which were first acquired. He would not predict, but he thought that in three years they ought to be paying dividends. The current price of the shares was, he said, $2\frac{3}{4}$.

A Shareholder.—You can have mine at that figure.

The Chairman.—I will take them. Continuing, he stated that the directors would give shareholders who called at the office every possible information and every facility for investigating the securities. He then put the motion for the adoption of the report and accounts, and declared it carried unanimously.

The retiring director, Mr. H. M. Read, and the auditors, Messrs. Woodthorpe, Bevan, and Co., were afterwards re-elected, and the meeting closed with a vote of thanks to the chairman.

COMPANIES

Dai Nippon Brewery Co., Ltd.—At the general meeting of shareholders of the Dai Nippon Brewery Co., Ltd. (Asahi Beer) the results for the first half of the year were to be declared as follows:—Net profit for the term, Y.614,921.17; balance brought forward from preceding term, Y.429,255.22; total Y.1,044,176.39. It was to be proposed that this should be distributed as follows:—Legal reserve, Y.45,000; bonus to officers, Y.30,746.05; dividend (13 per cent. per annum), Y.488,800; employees, pension fund, Y.25,000; carried forward to the next term, Y.454,630.34.

Tokyo Gas Co.—This company made a profit of Y.1,811,204.47 for the last term, paid a dividend of 10 per cent. and carried forward Y.37,733.02.

Tokyo Building Co.—This company made a profit of Y.213,373.56 for the last term, paid a dividend of 9 per cent. and carried forward Y.8,852.27.

Central Stores, Ltd. (Shanghai).—This company has reduced its capital from \$751,845, divided into 50,000 ordinary shares of \$15 each and 123 founders' shares of \$15 each to \$375,922.50, divided into 50,000 ordinary shares of \$7.50 each and 123 founders' shares of \$7.50 each, and such reduction was effected by cancelling capital which had been lost or was unrepresented by available assets to the extent of \$7.50 per share of each of the 123 founders' shares, and of the 34,958 ordinary shares which had been issued and were outstanding and by reducing the nominal amount of all the founders and ordinary shares in the Company's authorised capital to \$7.50 per share.

Tokyo Fire Insurance Co.—This company made a profit of Y.276,933.79 for the last term, paid a dividend of 8 per cent. and carried forward Y.16,838.25.

Imperial Hemp Weaving Co.—This company made a profit of Y.2,138,388.34 for the last term, paid a dividend of 12 per cent. and carried forward Y.21,248.61.

Dai Nippon Artificial Fertiliser Manufacturing Co.—This company made a profit of Y.445,571.16 for the last term, paid a dividend of 11 per cent. and carried forward Y.24,033.05.

Mitsui Mining Co.—This company made a profit of Y.1,169,063.53 for the last term, paid a dividend amounting to Y.350,000.00 and carried forward Y.905,462.50.

Toshin Godown Co.—This company made a profit of Y.75,767.90 for the last term, paid a dividend amounting to Y.40,000.00 and carried forward Y.21,481.49.

Nippon Shosen Kaisha.—This company made a profit of Y.11,351.15 for the last term, paid a dividend of 4 per cent and carried forward Y.1,977.05.

Kanegafuchi Cotton Spinning Co.—This company made a profit of Y.1,851,523.57 for the last term, paid a dividend of 12 per cent. and carried forward Y.1,614,390.73.

INDUSTRIAL.

Messrs. Lever Bros., Ltd., Kobe.—The soap factory of Messrs. Lever Bros., Ltd., Mr. C. U. Stuart, formerly of Dairen, Manager, located at the mouth of the Muko River, Amagasaki, near Kobe, disposes of about 3,000 pieces of bean cake imported from Manchuria daily. The bean cake is put through a chemical process for extracting the oil still left in the cake to the average amount of about 7 per cent. The oil thus extracted is used for the making of soap. It is not clear what disposal is made of the bean meal left after the extraction of oil, but there is little doubt that most of it passes into the hands of fertilizer dealers. The annual consumption of bean cake by this Factory is put at about 80,000,000 pieces or about 25,000 tons.

Japan Paper Mills.—With the yen 2,000,000 borrowed, the Oji Paper Mill (Japan) Company will effect extensions of its plant to produce 3,000,000 lbs. a month of news printing paper.

An extension of the works of the Noda Paper Mill Company for producing an additional 200,000 lbs. a month having been almost completed the new machinery is to be started shortly.

The proposed extensions of the Kokura and Umezu Mills will come next under the agreement, and their completion will add to the monthly production 300,000 or 400,000 lbs. each. Their financial position, however, may not allow them to take the extensions in hand in the course of this year.

Other large mills are still withholding the particulars of their plans of extension.

Extensions of the Fuji, Mitsu Bishi, and Okawa paper mills have been decided on, but the work of extending these mills will not be started this year, for financial reasons.

The Yukensha, the Kyushu, and some other paper mills had projects for extension, but have abandoned them because the demand for the classes of paper they contemplated manufacturing has not increased to the extent anticipated.

The schemes that seem likely to be carried out, will increase the annual production of paper in Japan to about 120,000,000 lbs., and the mill extensions for this purpose will be ready to begin operations by 1917.

MINING

Colorado (P. I.) Mines.—Fifteen hundred ounces of gold bullion from the Colorado Mining Co.'s mines in Masbate Island were received in Manila on July 26. The shipment represented a fifteen days' run and was estimated to be worth P. 36,000.

Tin in China.—The output of tin from the Kochiu mines, near Mengtsz (says a Consular report) reached a record in 1912, but there is every possibility of a much greater export in 1913 and succeeding years. Eight thousand two hundred tons passed through the Mengtsz

Customs in 1912, as against 6,600 tons in 1911. The erection of the modern smelting and refining plant bought from a German firm is nearing completion, and it is hoped that it will be possible to commence operations in May. So far, the tin exported has been refined by primitive native methods only. It is supposed that there was a surplus of tin held over in 1911, owing to the rising market, which caused the merchants to hold back their supply in anticipation of higher prices in 1912. Their speculation was justified, as the average price at Mengtsz in 1911 of \$92 (£8 1s.) per picul (133 1/8 lb.) rose in 1912 to \$102 (£10 4s.). The tin trade, in spite of the repeated efforts of numerous foreign firms to get into touch with the market, is entirely in the hands of the Chinese merchants of Mengtsz and Kochiu, who combine to keep all foreign interests at arm's length. It is understood that the bulk of the tin is exported to Hongkong, where it passes into the hands of a German firm, for shipment to London.

Kailan Mining Administration.—The total output of the Administration's mines for the week ended August 9 amounted to 37,672.53 tons and the sales during the same period to 39,300.17 tons.

For the week ended August 16 the output was 38,455.55 tons and the sales during the same period to 32,594.71 tons.

PERSONAL

Baron von Seckendorff, acting German Minister, was received on August 12 by President Yuan Shih-kai.

Congressman Francis Burton Harrison has been appointed Governor-General of the Philippine Islands in succession to Mr. Forbes.

It is with extreme regret that we record the death of Mr. Frank R. White, Director of Education in the Philippines, which occurred on August 18.

Mr. R. C. Morton, who succeeded Mr. W. W. Campbell as manager of the Kobe branch of the P. M. S. S. Company, will take charge of the Co.'s office at Hongkong.

Mr. Gifford Jones, superintendent of the Cebu division of the Philippine Railway Company, has resigned to take up a position in Mexico. Mr. H. A. Glover has been appointed superintendent of the Cebu division.

President Yuan has decorated Colonel Brisaud, his military counsellor, with the 3rd class of the Golden Corn; M. de Margerie, ex-French Minister to China, with the 2nd class; and M.M. Picot and Piry with the 3rd class of the same order.

OIL

The Kerosene Oil Industry.—The Osaka Mainichi says rumours are in circulation that the Rising Sun Petroleum Company has approached the Hoden Kerosene Oil Company with a view to buying up kerosene oil refined by the Japanese Company and selling it in the Oriental markets under their own trade marks. The explanation given is that the demand for kerosene oil at home has greatly increased lately owing to the use of oil as fuel for warships and, consequently, it is reported that the Company sees that ultimately it will not be able to supply the market in the Orient from its own wells. The foreign Company therefore is now in danger of losing markets which it has built up in the Far East in the course of years. The Hoden Kerosene Oil Company, which has lately increased its output daily by 600 koku (one koku about 4 gallons), thanks to the employment of more up-to-date methods, would have willingly accepted the offer of the Rising Sun Company, rather than store unrefined oil produced in excess of the demand, had not they anticipated disputes between the two companies over their respective trade marks. Under these circumstances, the Japanese concern has not yet given an answer, and the negotiations remain unsettled. Owing to the employment of a new method of boring, the output of oil has been greatly increased since last year, but even now the output does not exceed one-half of the total consumption of this country. If the increased output of kerosene goes on at the same rate as during the past year, Japan may be able in time to check the import of foreign oil and produce enough to meet her own requirements. But it is still premature to think of this, as Japanese oil refiners have much leeway to make up before they can expect to beat foreign importers. Such being the case it will be difficult for them, for the present, to find a market for the increased output of kerosene oil, seeing that the yield is increasing so much.

OTARU LUMBER MILL COMPANY

The Otaru Lumber Mill Company was to hold an extraordinary meeting of shareholders on Aug. 30th in the Tokyo Geographical Society's building, Kyobashi, when a proposal to wind up the company was to be considered.

The mill is the oldest of its kind in Japan and has enjoyed an extensive business both at home and abroad. Of late the protracted hard times have caused the profitable realization of the company's holdings to be difficult so that heavy losses have been sustained during the past twelve business terms, the loss for last term alone amounted to 117,000 yen. No stone has been left unturned to restore the business of the company to its former prosperous state, but now it is thought advisable to wind up the concern.

The British Engineers Association

London Office,

Caxton House,

Westminster.

Peking office to be opened on 1st August at the house recently occupied by Messrs. Wardroper and Co., in the

Wang Fu Ching Ta Chieh.

Enquiries to be addressed to:—

Capt. T. C. FitzHugh, M. V. O.

Chief Commissioner.

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